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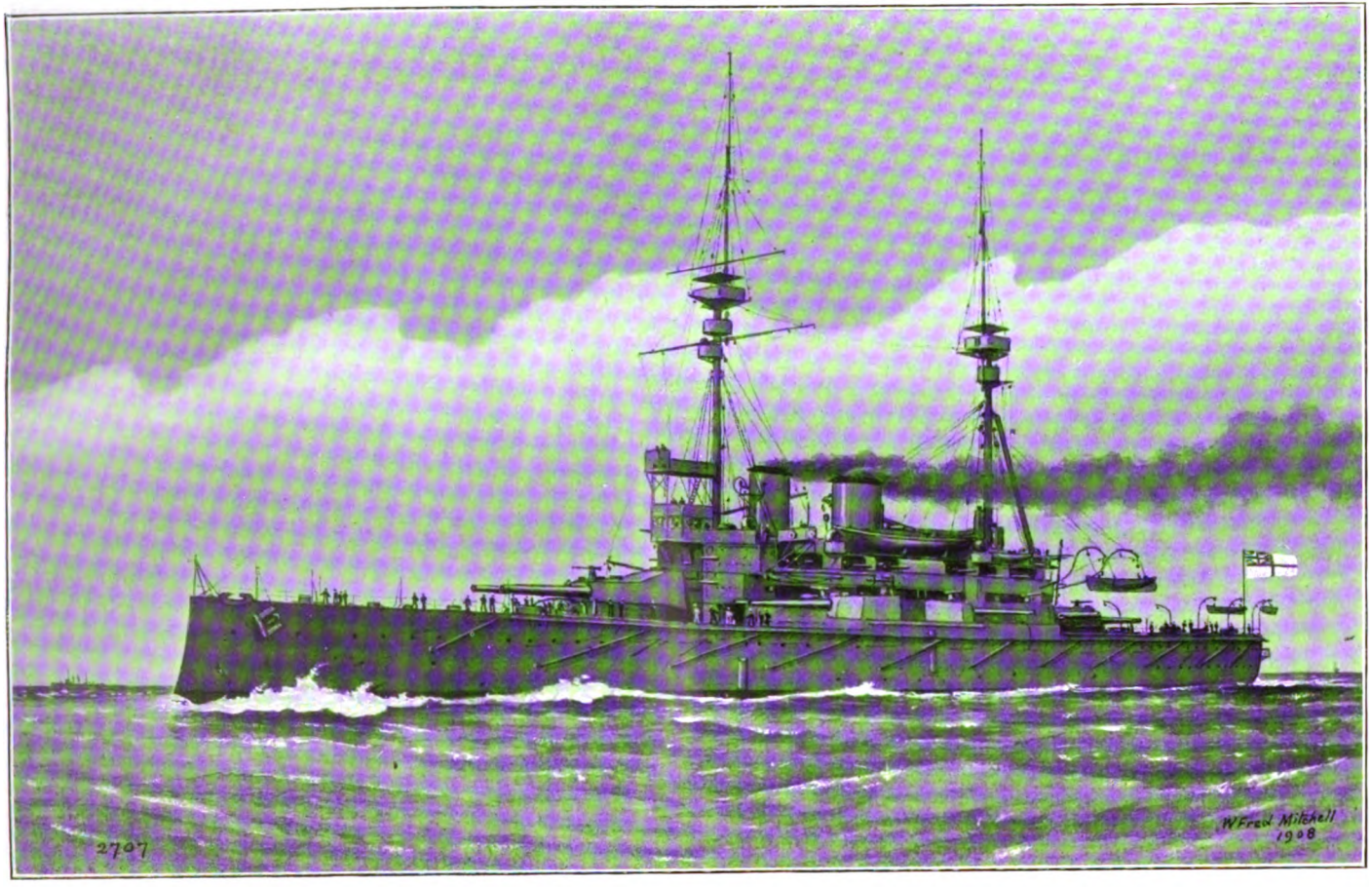

H.M.S. LORD NELSON.

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THE

NAVAL ANNUAL,

1908.

EDITED BY

T. A. BRASSEY, A.I.N.A.,

Member of Parliament; Commander of the Order of the Crown of Italy.

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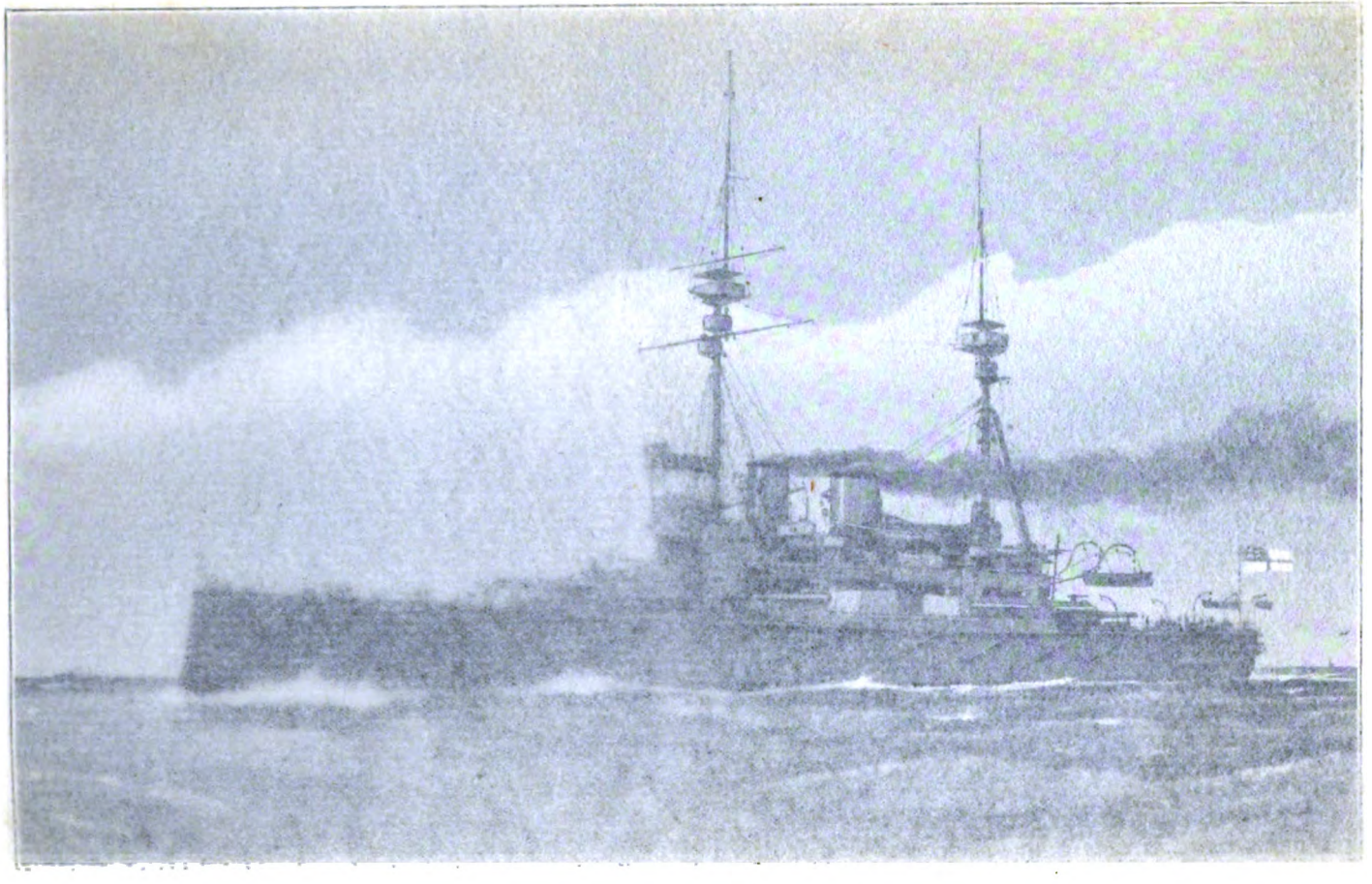

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THE

NAVAL ANNUAL,

1908.

EDITED BY

T. A. BRASSEY, A.I.N.A.,

Honorary Fellow of Balliol; Commander of the Order of the Crown of Italy.

"And ye take mine honour from me if ye take away the sea."—*Rudyard Kipling.*

PART I.—Admiral Sir CYPRIAN BRIDGE, G.C.B.; Sir FREDERICK POLLOCK, Bart.; JOHN LEYLAND; JACK LA BOLINA and ALEXR. RICHARDSON.

PART II.—List of Ships: Commander CHAS. N. ROBINSON, R.N., and JOHN LEYLAND.
Plans of Ships: S. W. BARNABY, M.I.N.A.

PART III.—Armour and Ordnance.

PART IV.—FIRST LORD'S MEMORANDUM; BRITISH AND FOREIGN ESTIMATES; HAGUE CONFERENCE PAPERS, ETC.

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PREFACE.

ONE of the chief features in the present number of the *Naval Annual* is the uncertainty of the particulars given regarding many ships under construction. The recently introduced British practice of withholding the details of dimensions, engine-power, speed, and armament, which were formerly published in the Navy Estimates, has been imitated in Germany and elsewhere. On this practice a competent authority, who desired that his contribution should be unsigned, made the following comments in the article on British Shipbuilding Programmes in the *Naval Annual* of 1907 :—"From the nature of the case, after a warship has been laid down, information as to details of design must be in the hands of many persons, and can be procured by those who attach importance to its acquisition. This is a matter of common knowledge ; it is idle to assume that secrecy such as is claimed can be preserved." It is certain that, whether through the agency of the secret services or by other means, information as regards new designs is placed in the hands of all those from whom there would be an advantage in concealing it, while the Parliaments and taxpayers who have to provide the money are kept in ignorance.

The particulars given with regard to new ships must in many cases be accepted with reserve. Both in the reviews of the progress of Navies, in Part I., and in the lists of ships, in Part II., the uncertain character of information where this is the case has, where necessary, been indicated. The Editor's task has been one of unusual difficulty this year, and no one is more conscious than he that in such a mass of figures and details there must be errors, in spite of all the care and trouble taken to ensure accuracy. He is always grateful to those who are kind enough to write to him calling attention to mistakes which they may have discovered.

Apart from the usual chapters, Part I. contains an interesting article on the Second Peace Conference by a new contributor, Sir Frederick Pollock ; one on the Naval and Maritime Industries of Italy, by the well-known Italian Naval writer, "Jack la Bolina" ; contributions from old supporters of the *Naval Annual*, Admiral Sir Cyprian Bridge and Mr. Leyland ; while the subject of Engineering,

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which has not been reviewed since the untimely death of Mr. Dunell, is dealt with by Mr. Richardson.

Captain Robinson, Mr. Leyland, and Mr. Barnaby remain as usual responsible for the lists and plans of ships in Part II. Captain Robinson has kindly undertaken the arduous task of compiling the section on Armour and Ordnance, which was omitted last year.

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INTRODUCTION.

By Lord Brassey, G.C.B.

The Editor of the *Naval Annual* desires that the present issue should be introduced with a foreword from his predecessor. It is difficult to say anything which is new and which is also true.

Estimates.

A serious effort has been made under the present Administration to lighten the burdens of the taxpayer. Reduction in the Navy Estimates has hitherto been justified; the situation has been changed by increasing activity in Germany in relation to shipbuilding for the Navy. We do not criticise the policy of Germany. If we go back ten years we see that country in a position of hopeless inferiority to the united naval forces of France and Russia, Powers which were bound together by a close alliance. Naval expansion was necessary for Germany, for self-defence, and to uphold the national interests in distant parts of the world. Fully appreciating this fact, and acting in no unfriendly spirit, we are bound to maintain our maritime supremacy. The Fleet of England is her all in all. The demands which must be made for increased appropriations for construction can be only partially met by economy in other votes. The numbers voted for the permanent service of the Navy are in excess of the two-Power standard:—Britain, 128,000; Germany, 47,000. Our numbers exceed our requirements for manning all the ships on the Navy List that can be reckoned effective.

Manning.

While some reduction seems possible in the seamen class on grounds of general policy, an increase in the Marines is desirable. An amphibious force is peculiarly adapted to the requirements of an Island Power. The Marines help to man the Fleet; they furnish men for expeditions on shore. The splendid battalions of seasoned men would be helpful in stiffening our military forces in an emergency. Marines should garrison our naval stations abroad. Reductions in the votes for manning must be gradual, and are only possible by pursuing a consistent policy, approved by both sides in politics. The more the subject is considered the more plainly it appears that economy in defensive preparations mainly depends on the wise

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statesmanship with which our foreign policy is directed, avoiding wars of aggression and maintaining peace with honour.

Ship-building.

Shipbuilding is at once an interesting and a disheartening branch of naval administration. The experience of the past has ever been that the best work of to-day is deemed obsolete to-morrow. Shipbuilding problems can admit of no final solution; the progress of naval science is unceasing. There are differences of opinion among the best authorities. As to one leading principle there can be no difference: the British Navy must be strong in battleships. The Dreadnought, the latest production, is the outcome of the best efforts of technical experts, in consultation with naval men of the highest eminence. The testimony of the nations to the merits of the new type is universal. Imitation is the sincerest form of flattery. Dreadnoughts are being laid down for the Navies of all the great Maritime Powers. Some doubt, however, remains. The armament of all big guns and the high speed are the salient features in the new design; they have not been obtained without the loss of other

Battle-ships.

elements of fighting efficiency. The Lord Nelson and Agamemnon, the immediate predecessors of the Dreadnought, are superior in protection, and carry an effective secondary armament. Within the practicable range of naval battle, the main armament is not sensibly inferior to that of the Dreadnought, nor is the speed—18 knots on the measured mile—contemptible. It has been the policy in late years to lay down ships in groups, with obvious advantage in relation to the homogeneity of squadrons. Having produced a type so successful, it would be well to lay down at least four Lord Nelsons. They would be powerful as battleships, and could upon occasion do the work of the armoured cruiser. Many naval officers would prefer to take the chances of battle in the Lord Nelson, rather than in the Dreadnought.

In addition to the Lord Nelsons and improved Dreadnoughts, a special type seems necessary for service in narrow and shallow waters. The big ships are for the open ocean, where large dimensions offer advantages in speed, coal endurance, and steadiness of platform.

Cruisers.

If it is difficult to determine the best type for the line-of-battle, it is still more difficult to design for the services performed in the elder day by the fast-sailing frigate. We have expended many millions in building cruisers, officially described as protected, yet answering most imperfectly to that description. No ships can be reckoned as combatants unless their guns, including the necessary secondary armament, are fully protected, either in turrets or casemates, or by side-armour. All cruisers built for the Navy should be armoured vessels.

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For scouting over wide stretches of ocean, no fighting ship could compete with the liners of the North Atlantic, in coal-supply and power of maintaining a high rate of speed for long distances. Recommendations in favour of liberality in regard to subsidies have thus far been as the idle wind. For the ocean scout a speed of 20 knots should be sufficient, and the subsidies to such vessels would not be excessive. Scouts.

It is not necessary to insist on the exacting conditions which the Cunard Company were required to meet. The Lusitania and the Mauretania were built to regain for Great Britain the blue ribbon of the North Atlantic. It was the wise resolve of the late Government to give its support in an honourable rivalry. The building of such ships is a just source of national pride, shared by no class more fully than by the skilled workers with their hands. As the Lusitania left the Tyne, completed for sea, it was a stirring sight to see the tens of thousands gathered on the river side. Those sturdy Northumbrians took an honest pride in the noble specimen of their consummate workmanship. It is not necessary at the present time to argue unavailingly for subsidies. We have in the Navy proper many ships, such as those of the County class, which, from want of protection, are weak as combatants, but which possess splendid steaming qualities. We look to these ships as our ocean scouts. With the means which defenders now possess in the shape of mines and torpedoes, close blockades can no longer be maintained by a battle fleet. Watch and ward must be kept by a squadron, lightly armoured and armed, yet of sufficient size to remain at sea. The destroyers designated in the Estimates of the present year as ocean-going have displacements of nearly 900 tons. The Swift, described as a destroyer of a special type, is a vessel of 1800 tons, estimated to cost £250,000. Such vessels will be numerous in future programmes of construction. Captain Bradley Fiske, the writer of an essay to which the prize of the United States Naval Institute was awarded, insists that more protection is desirable for destroyers. Protection cannot be given without increasing dimensions.

These observations, perhaps unduly extended, are submitted for what they may be worth. The responsibility for decisions as to construction rests with the seamen at the Board of Admiralty and their able technical advisers. Every source of information is open. We do not look for infallibility, or gifts of prophecy as to the changes which the progress of naval science is sure to bring. We are assured that, in proportion to cost, as good work is done in construction for the British Navy as for any other maritime Power.

We are on surer ground when we turn to training. Its importance Training.

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it is hardly possible to exaggerate. As Sir Reginald Custance has truly said, "Battles are won by men and not by ships." Captain Bradley Fiske has pointed out that it is a fact notable in naval history that up to the battle of St. Vincent nearly every victory went to the side which had the most ships, while since then it has gone to the side which, from causes preceding the battle, had the best trained *personnel*. In the battle of St. Vincent the Spaniards were untrained. It was the same with the French and Spaniards at Trafalgar, with the Chinese at the Yalu, the Spaniards at Manila and Santiago. Want of training, and the unintelligent apathy of the Russian people, gave an overwhelming and an easy victory to Japan.

To the British Board of Admiralty the praise is due of giving full opportunities of training to our officers and men. The work done in 1907 has been summarised as under:—

February 13-22 .	Combined exercises by the Channel, Atlantic, and Mediterranean Fleets at Lagos.
April 16-30 . . .	Exercises of destroyer flotilla with nucleus crews in Torbay.
May 7-14 . . .	First practice cruise of the Home Fleet.
June 25-August 29	Cruise and manœuvres of Channel Fleet in the North Sea.
June 25-July 10 .	Combined exercises of the Fifth Cruiser Squadron and the Second Torpedo Flotilla attached to the Channel Fleet.
June 18-July 12 .	Cruise of the Nore Division to Norway and Scotland.
July-August . .	Cruise of the Atlantic Fleet in Irish waters.
July 22-August 8 .	Mobilisation of the Home Fleet and cruise to Torbay and Cowes, concluding with manœuvres.
October 14-25 . .	Manœuvres of Channel and Atlantic Fleets and Nore Division in the North Sea, with their three cruiser squadrons and four fully-manned divisions of torpedo-boats.

It is not possible to pass from the subject of manœuvres and training without allusion to the recent collision, in which the torpedo-destroyer Tiger was cut in two, with grievous loss of life. Training in peace should be as severe a test as possible of the qualities required in war. Steaming at high speed in dark nights, with all lights out, is not so much a test of skill as a venture, in which nearly everything is left to chance.

In conclusion, I have recently been in company with our squadrons abroad, and have once more visited our dockyards at Gibraltar and Malta. Old impressions have been confirmed. In every department, efficiency; in every officer and man, the resolve to tread the path of duty. To the Navy, praise is more than a personal tribute. It is the award of the nation to its sailors and soldiers.

> Thank Him who isled us here, and roughly set
> His Briton in blown seas and storming showers;
> We have a voice, with which to pay the debt
> Of boundless love and reverence and regret
> To those great men who fought, and kept it ours.

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PART I.

CHAPTER I.

THE BRITISH NAVY.

THE number of ships completed during the year under review has been considerably less than usual. There has been some delay in the completion of contract-built ships owing to labour disputes. The armoured cruisers Minotaur and Shannon, programme 1904-5, are the only important ships completed. The battleship Agamemnon, though not completed within the financial year, will probably be ready for sea before this volume is published; the completion of the Lord Nelson has, for the reasons given above, been delayed. Three battleships of the Dreadnought type, three armoured cruisers of the Invincible class, and the armoured cruiser Defence have been launched. Three battleships have been laid down. Progress of new construction.

The battleship Agamemnon, launched at Messrs. Beardmore's yard on June 23rd, 1906, and the Lord Nelson, launched on September 4th, 1906, at Messrs. Palmer's yard, Yarrow, are of 16,500 tons displacement. Estimated speed, 18 knots; armament, four 12-in. and ten 9·2-in. guns. The following particulars of the trials of the Agamemnon are taken from *Engineering*:— Agamemnon.

Name.	Makers of Machinery.	At one-fifth Power.			At four-fifths Power.			At full Power.		
		Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.
Agamemnon ...	Hawthorn Leslie	knots. 11·8	3,494	lbs. 2·15	knots. 17·03	12,023	lbs. 1·9	knots. 18·75	17,285	lbs. 2·14

The Agamemnon is fitted with Yarrow boilers.

We gave last year a very full description of the Dreadnought and particulars of her trials. During the summer she made extensive further trials for the purpose of experimenting with different propellers. On her original trials the maximum speed obtained was 21·8 knots with 27,500 I.H.P. On the more recent trials, the significance of which is discussed in a later chapter, with 26,400 I.H.P., the speed was 20·7 knots. One of the chief objections to the Dreadnought class.

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Dreadnought class for operations in the North Sea is their great draught, which is well over 30 feet when in sea-going trim. If the ship was injured on one side to such an extent as to give her several degrees of heel, the draught would be largely increased. How many ports or docks could the ship enter in an injured condition? Three ships of the improved Dreadnought type (programme 1906–7) have been launched, viz., the Bellerophon at Portsmouth on July 27th, the Temeraire at Devonport on August 24th, and the Superb at Elswick on November 7th. These ships have a displacement of 18,600 tons, and are therefore some 700 tons bigger than the Dreadnought. The estimated speed is 20·75 knots with 23,000 I.H.P. The engines are of the turbine type. The main armament will consist, as in the Dreadnought, of ten 12-in. guns, but the centre turret, instead of being on the upper deck, will be on the same level as the turret on the forecastle. This will give these guns a greater arc of fire aft. 4-in. guns have been substituted for 12 pdrs. in the anti-torpedo boat armament. The machinery of the Bellerophon is by the Fairfield Company; that of the Superb by the Wallsend Company; that of the Temeraire by Hawthorn Leslie & Co. The two first-named ships have Babcock boilers, the last-named Yarrow boilers.

Ships laid down.

The battleship St. Vincent, of the 1907–8 programme, was laid down at Portsmouth on December 30th, 1907, the Collingwood at Devonport on February 3rd, 1908, and the Vanguard* is building by Messrs. Vickers at Barrow. Displacement, 19,250 tons; length, 500 ft.; beam, 84 ft.; mean draught, 27 ft.; estimated speed, 21 knots; I.H.P., 24,500 (or 1500 more than that of the Bellerophon), to be obtained in the case of the St. Vincent under natural draught, in the Collingwood and Vanguard under forced draught. The machinery of the St. Vincent is by Scott & Co., Greenock, of the Collingwood by Hawthorn Leslie & Co., and of the Vanguard by the builders of the ship.

The tenders for the hull and machinery of the Vanguard show very great differences. They were as follows:—

	£
Messrs. Vickers, Barrow	628,000
John Brown and Company, Clydebank	667,000
Messrs. Beardmore	704,000
Messrs. Palmer	712,000
Fairfield	734,000
Armstrong, Whitworth and Company	738,000
Scott Shipbuilding and Engineering Company	764,000

Cruisers.

All the cruisers of the Warrior class have been completed. Particulars of their trials were given last year.

* Laid down April 2nd. Displacement to be increased.

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The three armoured cruisers of the Minotaur class have a displacement of 14,600 tons, and the estimated speed with 27,000 I.H.P. is 23 knots. The Shannon and the Minotaur have been through their trials, those of the Defence have been somewhat delayed. The following particulars are taken from *Engineering*:— Minotaur class.

Name.	Makers of Machinery.	One-fifth Power. 1st 30 hours' trial.			2nd 30 hours' trial.			Full Power.		
		I.H.P.	Speed.*	Coal.	I.H.P.	Speed.*	Coal.	I.H.P.	Speed.*	Coal.
			knots.	lbs.		knots.	lbs.		knots.	lbs.
Shannon	Humphrys Tennant & Co.	5,864	14·39	1·96	19,621	20·92	1·83	28.553	22·49	2·01
Minotaur ...	Harland & Wolff	5,643	14·1	1·74	19,750	21·47	1·63	27,856	23·01	1·59

* Measured Mile.

The Defence, the third ship of the class, was launched at Pembroke on April 27th, 1907. The principal features of other British and foreign cruisers under construction as compared with those of the Minotaur class were given last year. The Minotaur class will certainly be better able to fight their guns in a sea-way than the Duke of Edinburgh or Black Prince, and the armament is more powerful than that of the Achilles or French Edgar Quinet. The Japanese cruisers Tsukuba (13,750 tons) and Kurama (14,620 tons) each carry four 12-in. guns in addition to a good secondary battery, but their speed is 1 to 2 knots less than that of the British ships. The Japanese sacrifice speed to offensive power, which is after all the most important quality in a ship of war, though the tendency in our own and other navies appears to be to rather exaggerate the value of speed.

The three armoured cruisers (or cruiser battleships) of the Invincible class were all launched in the spring of 1907; the Invincible at Elswick on April 13th, the Inflexible at John Brown & Co's. yard Clydebank, on June 26th, and the Indomitable at Fairfield on March 17th. Displacement, 17,250 tons; I.H.P., 41,000; speed, 25 knots. The main armament consists of eight 12-in. guns. The armament of the armoured cruisers (18,650 tons) building or projected for the Japanese Navy is reported to include ten 12-in. besides 6 in. and 4·7 guns. The armament of the large cruisers (E, F and G) under construction or proposed for the German Navy is not yet known. The value of the Invincible class and similar types building abroad is discussed in a later chapter. Invincible class.

As pointed out last year, Invincibles are far too large and too costly for the ordinary duties of cruisers. From a recent speech of

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the First Lord in the House of Lords it appears reasonable to conclude that the intention is to utilise them as battleships.

Boadicea. The Boadicea, which can best be described as a "scout," is building at Pembroke.* Displacement, 3300 tons; speed, 25 knots; I.H.P., 18,000. She is to be fitted with four propellers and turbine engines, the contracts for the engines and boilers having been obtained by Messrs. John Brown and Company, Clydebank. The armament is said to comprise three 4-in. guns. The Germans have a very large number of vessels of this class completed or under construction. The Gazelle class, which were completed about 1901, had a displacement of 2600 tons, and a speed of 21–22 knots. The displacement and speed have been greatly increased until the latest ships of the type have a displacement of 3600 to 3800 tons and an estimated speed of 24½–25 knots. All carry an armament of ten 4·1-in. guns, which is therefore much more powerful than the reported armament of the Boadicea. The great objection to the vessels of the Boadicea type, whether described as third-class cruisers or scouts, is the high cost in comparison with the fighting qualities, which have been sacrificed to speed. The cost of the Boadicea is £333,067.

Swift. The remarks just made with regard to the scout class apply with almost as much force to the Swift, the dimensions and other particulars of which were given last year. The Swift was launched at the Birkenhead yard by Messrs. Cammell, Laird & Co. on December 7th, 1907. The estimated speed is 36 knots with 30,000 I.H.P., and the cost is £250,292. The Swift is to be fitted with four propellers, each on a separate shaft, and Parsons turbine machinery manufactured by Messrs. Cammell, Laird & Co. The boilers are of the Express straight tube type and are arranged for the consumption of oil fuel. The armament comprises four 4-in. guns and two torpedo-tubes.

Ocean-going destroyers. Four of the five ocean-going destroyers of the Tribal class have been completed, viz., the Cossack, Ghurka, Mohawk and Tartar. Particulars of the trials as published in the *Times* are given below. The contract speed was 33 knots, with 14,000–14,500 I.H.P.

Name.	Built by.	Speed on Measured Mile.	Speed on Six Hours' Run.
		Knots.	Knots.
Cossack	Cammell and Laird	33·15	33·1
Ghurka	Hawthorn Leslie	34	33·91
Mohawk	White	34·51	34·25
Tartar	Thornycroft	35·67	35·36

* To be launched May 14.

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H.M.S. TARTAR.

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The speed attained by the Tartar is very remarkable. During the six hours' run she covered 233 miles. All burn liquid fuel, of which they can carry from 75–95 tons. Eight other vessels, making twelve in all, of the Tribal class are under construction. The Afridi was laid down in August 1906 at Elswick, the Amazon by Messrs. Thornycroft at Woolston June 24th, 1907, the Saracen on July 12th, 1907, by Messrs. J. S. White & Co., at Cowes. The Afridi is of 795 tons displacement, the other vessels of the class are of 860–890 tons displacement. The displacements of the Nubian, Crusader, Maori, Zulu and Viking are not given in the Estimates. The Saracen and Amazon will carry two 4-in. guns, the other boats three 12-pdrs.

Just as the old torpedo-gunboats, which proved themselves in various manœuvres such an effective reply to the torpedo boat menace, gradually grew in size from the 525 tons of the Rattlesnake to the 1070 tons of the Halcyon class, so the modern destroyer has grown from the 250–300 tons of the boats launched in 1893–5 to the 800–900 tons of the Tribal class. The cost of the Tribal destroyers is not given in the Estimates, but from the fact that over £1,430,000 is to be spent on 12 boats before March 31st, 1909, it is evident that they will cost well over £120,000 apiece. Just as the torpedo-gunboat developed into a type too large, too costly, and too slow for the purpose for which it was designed, so the destroyer has grown into a type too large and too costly, though certainly not too slow for the destruction of torpedo-boats. They cannot be built in sufficient numbers unless we are prepared to divert too large a proportion of the shipbuilding votes from capital ships to their construction. The Tribal class are, in fact, destroyers of destroyers, and should be more properly classified under the old name of torpedo gunboats.

Torpedo boats.

Ten torpedo boats of the coastal destroyer type, now described as first-class torpedo boats, 240–250 tons displacement, have been completed or are completing. Twenty-two others are under construction and will be completed in 1908–9. £1,366,880 will be spent on these 32 torpedo boats up to March 31st, 1909.

Sub-marines.

One submarine (A13) of 204 tons, and eight C type of 313 tons displacement have been completed by Messrs. Vickers. Twelve C type will be completed by the same firm in 1908–9. D1 of a new design is to be laid down. Four submarines, C 17 to 20, are under construction at Chatham dockyard. The amount to be expended in 1908–9 on dockyard-built submarines is £144,759, and on those building by contract £473,563, or a total expenditure on submarines of £618,322. The construction of four submarine boats of 313 tons

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displacement and 13 knots surface speed at Chatham Dockyard is a new departure.

Ships struck off the Active List or sold.

The Devastation and Thunderer (launched 1871–2), the Colossus and Edinburgh (launched 1882), and the five battleships of the Admiral class have been removed from the Active List. The Collingwood, which was struck off last year, was withdrawn from sale, the reserve not having been reached. The Colossus is to be sold. The remaining battleships mentioned above are placed in the list of vessels available for subsidiary services. The armoured cruiser Aurora has been sold for £12,700 and the torpedo gunboat Sheldrake for £3900. The third class cruiser Medusa is to be sold.

Merchant cruisers.

The Lusitania and the Mauretania, built under special subvention for the Cunard Line, have been through their trials and are now on service. Their dimensions are as follows:—Displacement, 38,000 tons; length over all, 785 ft.; beam, 88 ft.; draught, 33 ft. 6 ins. They are fitted with Parsons turbine engines and with 25 cylindrical boilers. The designed speed was 25 knots with 68,000 I.H.P. The machinery is placed almost entirely below the water line. The armament consists of eight 6-in. guns. Both ships were tried over a course of 1200 miles, the mean speed attained by the Lusitania being 25·4 knots and by the Mauretania 26·04 knots. On another trial on a shorter course of 59 miles the speed attained by the Lusitania was 26·45 knots and by the Mauretania 26·17 knots. The best average speed yet made by either ship on the passage across the Atlantic is 24·42 knots (made by the Mauretania).*

Improvement in torpedoes.

We alluded last year to the improvement in speed obtained with torpedoes which were fitted with an arrangement for heating the air used to propel them. The highest speed then reported was 35·3 knots. Further improvements have since been obtained, and in an article in *Engineering* of February 14th, 1908, the following table was given showing the speeds obtained by the latest Whitehead torpedo:—

Yards.	With Cold Air. Knots.	With Hot Air. Knots.
At 1,000	35	43
„ 1,500	30	40
„ 2,000	28½	38
„ 3,000	23-24	32
„ 4,000	18-20	28

Gunnery.

A further improvement in the gunnery of the Navy has taken place, as is shown by the following table:—

	1906 Target. 1906.	1906 Target. 1907.	1907 Target.
Number of hits	5,733	7,547	4,073
Number of misses	2,328	1,991	5,465
Total rounds fired	8,061	9,538	9,538
Percentage of hits to rounds fired ...	71·12	79·13	42·70

* The Lusitania averaged 24·65 knots for four days in November, 1907.

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The percentage of hits to rounds fired in the years 1898–1901 varied from 31·6 to 36·3, and in the years 1902–4 from 41·1 to 46·04, while in 1905 it was 56·58. A smaller target has been used in 1907 than in 1906, and while on the 1907 target the percentage of hits to rounds fired was only 42·7, on the 1906 target they were 71·12 and 79·13 for 1906 and 1907. On the 1906 target the hits per gun per minute are as follows :—

—	1905.	1906.	1907.
12-in. and 10-in gun	0·58	0·81	0·61
9·2-in. „	1·40	2·84	3·25
7·5-in. „	—	—	3·48
6-in. „	4·14	5·68	5·93
4·7-in and 4-in.	3·73	4·96	5·73

The Gunlayers' Tests and Battle Practice of the principal Fleets were carried out under the supervision of a committee, so as to ensure a uniform method of assessing the number of hits obtained by each ship. A summary of the results is given, as last year, in Part IV.

Navy Estimates 1908-9.

The Navy Estimates for 1908–9 amount to £32,319,500, a net increase of £900,000 on the Estimates for 1907–8. The principal items of increase are £260,000 on Vote 1 (Wages); £290,000 on Vote 2 (Victualling and Clothing), due largely to the new Victualling and Canteen arrangements; £386,300 on Vote 8, Section I.; £1,121,800 on Vote 8, Section II., due largely to increased expenditure on repairs; and £70,000 on non-effective services. There are decreases of £425,000 on Vote 8, Section III., contract work, of £300,000 on the Ordnance Vote, £451,700 in the expenditure on Naval Works, and of £50,000 on the vote for the Naval Reserves. A fuller explanation of the various increases and decreases is given in the First Lord's Memorandum, which is printed in Part IV. The Annuity in Repayment of Loans under the Naval Works Acts and charged in the vote for Naval Works has risen from £1,214,402 in 1907–8 to £1,264,032 in 1908–9; while the expenditure from Loans under the Naval Works Acts has fallen from £1,135,000 to £896,925.

Personnel.

The number of officers and men (Vote 4) remains at the same figure as last year, but there is an increase of 430 proposed in the number of boys under training, which appears to indicate an increase in the permanent force in future years. The Royal Naval Reserve, which is drawn from the Mercantile Marine and the fishing population, is

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reduced by 62 officers and 3490 men in 1908–9 as compared with 1907–8. In the Fleet Reserve there is a decrease of 150 men in Class A (Pensioners) and an increase in Class B (non-Pensioners) of 1000 men. The following table shows the numbers voted for the various classes of Reserves:—

—	1907-8.	1908-9.	Numbers borne Jan. 1. 1908.
Royal Naval Reserve	27,036	23,484	25,155
Colonial Naval Reserve	1,400	1,400	—
Fleet Reserve—Pensioners	8,000	7,850	6,457
„ „ Non-Pensioners . . .	12,700	13,700	11,507
Naval Volunteer Reserve	3,700	3,400	3,285
Pensioners (Vote 14)	6,401*	7,049*	7,657*

* These numbers include all long-service pensioners under 55 years of age, after deducting the estimated number in Class A of the Fleet Reserve.

New construction.

The Vote for New Construction again shows a reduction, as it has done for the past four years. The Vote for 1908–9 stands at £7,545,202 as compared with £8,100,000 in the previous year, and £11,654,176 in 1904–5, the year of maximum naval expenditure. It is proposed to lay down in 1908–9 only one battleship and one large armoured cruiser (both in H.M. dockyards), a very large reduction on the programme of armoured construction which the Admiralty considered necessary two years ago. In addition to the above there are to be commenced six fast protected cruisers, sixteen torpedo-boat destroyers, and a number of submarines, of which one cruiser and two submarines will be built in the dockyards and the remainder by contract. The total expenditure on new ships will amount to about £760,000. About £140,000 apiece is to be spent on the battleship and armoured cruiser, so they will probably not be laid down till late in the year. £189,000 is to be spent on the dockyard-built protected cruiser, which will be similar to the Boadicea, but less than £7000 apiece on the five protected vessels to be built by contract. The former will be well advanced, the latter will hardly be commenced by March 31st, 1909. The contract-built cruisers will be of 4000–5000 tons displacement, have considerable coal endurance, and a speed of 23–24 knots. As only £4000 apiece is to be spent on the sixteen destroyers, they will also barely be commenced within the next financial year. About £100,000 is to be spent on submarines, and no less than £93,000 on tugs, lighters, etc.

New works.

The principal new works proposed in the present Estimates are the construction of a new lock at Portsmouth at a cost of £940,000, and the erection of a naval depôt at Rosyth at a cost of £3,000,000.

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Only £65,000 will be spent on the former, and £35,000 on the latter during the year 1908–9, and it is proposed to spread the expenditure on Rosyth over ten years. That both these works should be pushed forward more vigorously was strongly urged in Parliament. The following official statement gives the principal items in the scheme for creating a naval base at Rosyth :—

Basin, having an area of 52½ acres, with projecting pier, giving a total wharfage of 7108 ft. Depth of water is 38 ft. 8 in.

Entrance lock, available for use as a dock, 850 ft. long, 110 ft. wide at entrances, and 36 ft. deep over sill at low water of spring tides.

A straight river wharf, 2733 ft. long, with 36 ft. depth at high water of neap tides. This wharfage is carried sufficiently deep to enable berths to be ultimately dredged to 36 ft. at low water of spring tides.

Emergency exit, 110 ft. wide, from basin, with depth similar to the basin.

Space for stacking coal is provided on the ground south of the entrance lock.

Dry dock, 750 ft. long, 100 ft. wide at entrance, and 36 ft. depth of water over the sill. This can be subdivided for use as two separate dry docks, 450 ft. and 280 ft. in length respectively.

Boat slip, 200 ft. by 130 ft. wide, one half of which is covered with light roofing.

Basin for submarine-boats (and temporarily for destroyers), 600 ft. by 470 ft., with a depth of 15 ft. at low water of spring tides. Floating dock, 250 ft. long, will be provided, together with jetties for twelve submarines and six destroyers.

An approach channel to the entrance lock will be dredged to a depth of 36 ft. at low water of spring tides, and a bottom width of 1050 ft.

Railways of the ordinary gauge are provided generally, and will connect up with the North British Railway Company's system. The scheme includes the usual equipment of railways, cranes, &c., and also workshops, storehouses, and residences for officers.

Electric light and power will be provided for the whole of the establishment.

Reserve space is provided for two future docks parallel with the one which is now to be built.

A new torpedo range, rendered necessary by the increased speed and range of the latest torpedoes, is to be established in Loch Long.

Repairs.

There is "an increased provision" to which the First Lord calls attention in his Statement "of £700,000 for repairs for the coming year," as compared with 1907–8. The policy of striking off the effective list or selling the large number of cruisers, etc., which have been so treated during the last three years was justified on the ground that it would lead to a large diminution in the cost of repairs and maintenance. The estimated expenditure under subheads D, Repairs, and E, Sea-Stores, in the Programme of Ship-building for the last four years and for the years 1908–9 is shown in the following Table :—

——	1904–5.	1905–6.	1906–7.	1907–8.	1908–9.
	£	£	£	£	£
Repairs . .	2,886,319	2,327,122	1,891,280	2,103,875	2,828,319
Sea Stores .	1,102,550	990,432	887,009	865,052	1,000,022
	3,988,869	3,317,554	2,778,289	2,968,929	3,828,341

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The estimated cost of repairs in 1908–9 is practically the same as in 1904–5.

The amount spent on repairs was for three years enormously reduced, and the "scrapping" policy apparently justified; but the facts that Mr. Robertson, the Secretary of the Admiralty, last year informed the House of Commons that he had insisted on a larger provision being made in the Estimates than was first thought necessary by his colleagues, and that so large an increase is proposed this year, show that there is considerable foundation for the belief that the expenditure on repairs has been unduly curtailed during the last three years. The number of battleships, large cruisers, and destroyers now maintained in commission is far larger than in the year 1903–4. Accidents, especially to destroyers, are numerous. Under these circumstances a permanent reduction in the expenditure on Repairs could not be expected.

Comments upon programme.

In commenting upon the programme of New Construction for 1907–8 in the *Naval Annual* of last year, the opinion was expressed that the Admiralty were justified in reducing the programme to three battleships, having regard to the delay in the commencement of new ships in Germany and elsewhere, and to the fact that we could still build more rapidly than foreign countries. The circumstances are now completely altered. Amendments to the German Navy Act have been passed which increase the number of battleships to be laid down annually in 1908, 1909 and 1910 from two to three. The Secretary of the United States Navy proposed to lay down four battleships in 1908, but, though President Roosevelt strongly supports an enlarged programme of construction, it is probable that the United States programme for 1908 will be cut down by Congress to two battleships. From information given in the following chapter there appears some reason to doubt whether we can still claim to build much more rapidly than Germany. The reduction in the programme of armoured construction proposed in the Estimates for 1908–9 has been widely criticised as an unjustifiable concession to the agitation of those Liberal Members of Parliament who desire a reduction in expenditure on armaments. Mr. Murray Macdonald's motion in favour of reduction, on March 2nd, was rejected by 320 votes to 73, but the debate was unsatisfactory in that it left in doubt the position of the Government as to the two-Power Standard. The anxiety felt on this point was somewhat relieved by the emphatic declaration of Mr. Asquith in the discussion on the Manning Vote on March 10th. Mr. Asquith concluded his reply to Mr. Balfour as follows:—

But without in any way forecasting what the shipbuilding programme for next year may be, I will say, without the faintest hesitation, that, if we find at that time

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that there is a reasonable probability of the German programme being carried out in the way that the paper figures suggest, we should deem it our duty to provide, and we should provide, not only for a sufficient number of ships, but for such a date of laying down of such ships that at the end of 1911 the superiority of Germany, which the right hon. gentleman foreshadows, would not be an actual fact. I hope that is quite explicit. That is the policy of his Majesty's Government; it remains on record; and I think it ought to reassure the House that we do not intend in this matter to be left behind.

The permanent force.

That economy in our naval expenditure is desirable has always been admitted in these pages, but economy should be sought in other directions than in the undue reduction of the shipbuilding vote. We have frequently protested against the extravagance of our expenditure on Naval Works, and of the manning policy adopted by successive Governments. The present Government have taken a long step to put an end to the former by placing all expenditure on Naval Works, apart from that to which they were committed by their predecessors, on the ordinary Estimates. The progressive increase in the permanent force which went on for the twelve years up to 1904–5 has happily ceased. It has been the main cause of the inevitable increase in the Navy Estimates, to which the First Lord refers in his Memorandum. A larger permanent force involves not only increased expenditure on the Wages Vote, on the Victualling and Clothing Vote, and on the Non-Effective Votes, but it necessitates the maintenance of a larger number of ships in commission in order to give officers and men practice at sea. The policy of accumulating men in naval barracks is not satisfactory, and has already had unfortunate consequences at Portsmouth. It is being to some extent superseded by an increase in the nucleus crews of ships in reserve.

Reserves.

To keep the whole Navy in a state of immediate preparedness for war, to depend almost wholly on the permanent force for manning the ships which would be commissioned on the outbreak of war, is undoubtedly the best policy—if it were not so costly. But when the time arrives, as it has apparently come, when a choice has to be made between an undue reduction of the shipbuilding vote, which can only have one result, and a reduction in the permanent force and larger naval reserves, the latter course is, in the judgment of the present writer, infinitely to be preferred. The Fleet Reserve is gradually growing. It is the most efficient of our Reserves. Steps have recently been taken to improve the efficiency of the Royal Naval Reserve; a commencement has been made with recruiting for the Naval Reserve from the seafaring population of the colonies. Further encouragement to those who are endeavouring to increase the supply of British seamen, and more serious efforts to utilise in the defence of the Empire the fine body of seamen which are to be

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found in our colonies, and notably in Newfoundland, are to be desired.

The maintenance of naval supremacy.

The main point on which the present Estimates have been criticised is that as regards new construction and naval works they postpone expenditure to future years. It is certain that on both these heads there must be largely-increased expenditure next year. In the present circumstances of this country, with so large a proportion of its people unemployed, and with the ever-increasing demands made upon the taxpayer to provide for education, old age pensions, and other measures of social reform, an increase in naval expenditure, inevitable though it may be, cannot be lightly undertaken. The burden of defending the whole Empire is, in fact, becoming too heavy for the taxpayers of the Mother Country alone. If the naval supremacy of the British Empire is to be maintained, if the British Navy is to be kept up to the two-Power Standard in face of the powerful navies which are being so rapidly built up in Germany and the United States, the resources of the whole Empire must be combined in the common defence. To further the cause of Imperial Federation has been the main object of the life of the present writer. That effective steps should be taken in this direction is more than ever necessary to-day.

T. A. Brassey.

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CHAPTER II.

Foreign Navies.

France.

The Reporter of the Committee of the Chamber on the Naval Budget for 1908 was M. Charles Chaumet. His report differs considerably in character from that of his immediate predecessors, and is devoted mainly to setting forth the present deplorable condition of the administration of the French Navy and to suggesting remedies. His report opens with the following remarkable passage:— Report of M. Chaumet.

"On dit couramment que la marine française traverse une crise. En vérité, sa situation n'est pas satisfaisante. Ses budgets se sont, en ces dernières années, accrus, et pourtant notre marine qui tenait autrefois le second rang est descendue au troisième. Elle sera bientôt tombée au quatrième.

"Il semble que nos sacrifices soient par avance frappés de stérilité. Ils le sont, en effet. En vain, nous multiplions les dépenses. Le rendement militaire, qui seul importe, ne s'accroît pas proportionnellement, ou même relativement décroît. Des organes parasitaires se développent au détriment du corps principal. L'administration absorbe la substance de la flotte de combat.

"Partout l'instabilité, l'anarchie. En présence de cette décomposition progressive, chacun rejette sur le voisin les responsabilités d'une situation dont aucun n'est personnellement l'auteur et dont tous ont au contraire à souffrir.

"Marins, ingénieurs, artilleurs, administrateurs, au lieu d'être unis fraternellement dans la loyauté d'une collaboration indispensable, sont aux prises dans la plus regrettable des hostilités.

"On souffre du présent. On n'a plus confiance dans l'avenir."

While giving credit to the good intentions of successive Ministers of Marine, and particularly to those of the present Minister, M. Thomson, M. Chaumet considers that the measures so far taken have been quite insufficient to deal with the situation. He suggested the appointment of an Extra-Parliamentary Commission which would be charged with the elaboration of a programme for the re-organisation of the Navy, and in which Naval officers should have the preponderating voice. A commission proposed.

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"Elle préparerait tous les éléments du projet de loi organique. Il ne serait pas nécessaire d'abroger les lois spéciales déjà votées; il suffirait de les codifier et de les mettre en harmonie avec l'ensemble du système."

M. Thomson's views.

When the proposal relative to the appointment of this Commission was brought before the Chamber, M. Thomson energetically protested against any such step being taken. If the Commission were appointed, necessary reforms would be retarded thereby. Several urgent measures were being prepared, in which the Parliament itself must collaborate, having arrived at an agreement as to the general naval programme. There was the duty of proceeding to lay down the ships required, which had been suspended during the year for reasons well known. "Il faut reprendre méthodiquement l'œuvre de construction des grosses unités." This was the most urgent work. Without losing a month, or even a week, the Chamber must have brought before it the proposed battleships, this being a capital matter, because, if no step were taken, the difference which is becoming too evident between the naval strength of France and that of other Powers would be accentuated. M. Thomson next referred to the proposed system of entering officers, and to the necessary changes with regard to the Inscription Maritime. He insisted that these were the really important work, and that the proposal of M. Chaumet would delay everything. The President of the Chamber, moreover, informed M. Chaumet that to invite the Government to carry on its work with the help of an Extra-Parliamentary Commission was unconstitutional, and the proposal was therefore abandoned. The Minister of Marine accepted a revised text of the motion, which expresses the view that the Chamber, convinced of the urgent necessity of proceeding to a general reform of the naval organisation (réforme d'ensemble de l'institution maritime), asks the Government to present as soon as possible an organic law for the Navy.

M. Chaumet's recommendation.

Recurring to the report of M. Chaumet, it may be observed that he says it is absolutely necessary to fix by law the composition of the Fleet. It should no more be left to the caprice of Ministers of Marine to determine the number and type of the ships to be built, than it is left to Ministers of War to decide whether to create or suppress, according to their personal view, regiments of infantry artillery, or cavalry. In the detailed sections of his report M. Chaumet recommends the more vigorous scrapping of obsolete ships. He suggests measures for accelerating the preparation of designs and for securing that all the ships of the same class should be homogeneous. The six battleships of the 1900 programme all differ from one another in details of construction. As regards the

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Government dockyards he considers that they are too numerous (an opinion in which M. Poirrier, the Reporter of the Senate, concurs), badly equipped as regards plant, and badly organised, and he speaks in strong terms of the want of discipline amongst the workmen. He suggests that the construction of large vessels should be confined to Lorient and Brest; the construction and repair of the torpedo flotilla to Rochefort and Cherbourg; while Toulon should be the repairing yard for the Mediterranean Fleet, in which the battleship strength of France is now concentrated. In order to remedy the existing state of disorganisation in the Ordnance service, M. Chaumet proposes that the responsibility for guns, gun-mountings, turrets, and ammunition hoists, which is at present divided between the Naval Construction and the Ordnance departments, should in future be concentrated in one department only.

Personnel.

The problem of providing for the recruiting of the Navy in the event of the reduction of the period of service of naval conscripts to the same length as that of the conscripts for the Army, viz., two years, has already been alluded to in previous reports. M. Chaumet accepts the reduction as inevitable, and supports M. Thomson's proposal that the *inscrits maritimes* should in consequence lose the right to serve in the Navy, and be liable to be drafted into the Army without losing their right to naval pensions. Each year the department should fix the number of men required for the various special ratings. The conscripts would retain the right of selection, provided they showed sufficient aptitude for the rating selected, and entered into an engagement to serve for four years, which might be extended to five years. M. Thomson's proposal provides for the enlistment:—

1. For 10 years, of pupils of the professional schools.
2. For 7 years, of youths from 17 to 18.
3. For 5 years, of youths of 18.
4. For 3 years, of youths of at least 18 years of age, of a special trade, and immediately available for service in the Navy.

The higher rates of pay would be reserved for those who voluntarily enlist, but would not be enjoyed by them till after they had completed the compulsory two years of service.

M. Chaumet makes suggestions for improving the prospects of petty officers, and for accelerating the flow of promotion in the officers' list by lowering the limit of age in various ranks.

Pay and allowances.

Some important changes have been made in the pay and emoluments of officers under a decree signed by the Minister of Finance on January 7th. Previous regulations on the subject are codified, and the object has been to fix the rate of pay, and the supplementary allow-

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ances for table money and other purposes. The rules with regard to table money have been revised entirely. Thus, instead of receiving a round sum for this purpose, flag officers and others holding commands are to receive special grants to provide for the entertainment of officers who are their guests under the regulations. A special sum is allowed for every officer received at their table, according to a particular scale. There are new regulations also with regard to sea pay and pay received by naval officers serving on shore. The effect has been to do away with counting time in certain shore billets as sea time. In part these reductions are compensated for by certain additions to pay received by officers holding particular appointments, as, for example, a captain supervising the completion of a ship, or a commander directing the establishment at Biserta, or holding command of a flotilla of submarines. There are also special local grants for the benefit of officers serving in Tunis. Staff pay is abolished except for the chief of the staff. Flag-lieutenants, engineers, accountants, and others attached to the staff of an admiral will lose their privileged situation. The new rules simplify the system and place it upon a better footing; but, as is not unnatural, they have caused much dissatisfaction in certain ranks and in officers holding particular appointments.

M. Poirrier's report.

The Senate report upon the Estimates was prepared by M. Poirrier. It consisted of five parts, in the first of which the reporter insisted upon the necessity of a powerful Navy, and of applying all the money voted to increasing the Navy to the maximum power possible. The *personnel* of all ranks must be trained and exercised; there must be vessels in no way inferior to those of other nations; there must be docks sufficiently large, and the dockyards must be properly equipped, including proper supplies of stores. From this point M. Poirrier proceeded to inquire as to the elements that constitute the power of a Navy, and he concluded that they lay in the *personnel,* even more than in the vessels, guns, and ammunition. The sentiment of the sea must be developed in officers, and they must be prepared to exercise the responsibilities of command. M. Poirrier thought that the proposed naval school and its system, which are referred to in another chapter, would offer in this respect great advantages. But he insisted upon the necessity of sea experience, and favoured the creation of one or two flying divisions in which all officers might gain much necessary experience. M. Poirrier next expressed great disapproval at the slowness of naval construction in France, and insisted that the plans of vessels should be ready on the day upon which the Government demands the supplies for the putting of them in hand. M. Poirrier had also some criticisms to

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make upon particular features in modern French ships, such as the small turrets, of which he disapproved. In the third part of his report he insisted upon the folly of spending money upon old vessels, recalling the outlay upon the Neptune, Friant, Suchet, and Amiral Duperré, and he asked if the work upon the Dupuy de Lôme and the Dupleix was useful. He agreed that money should not be spent in 1908 upon the Magenta, Baudin, Formidable, Dévastation, Courbet, Rédoutable, Terrible, and Fulminant, and would place many more vessels upon the scrap-heap than have been consigned to it by the Minister. The fourth part of this report was devoted to the naval ports and dockyards, and the fifth to the reform of administration.

Estimates.

The Navy Estimates as voted for 1908 amount to £12,797,303, an increase of £310,000 on the Estimates voted for 1907. The amount to be spent on new construction, including armaments, in 1908 is £4,319,411. This is distributed as follows:—Battleships, £2,090,000; armoured cruisers, £953,000; destroyers, £513,500; submarines, £763,000.

Battleships completed.

During 1908 practically all the ships of the 1900 programme will be completed. The battleships Patrie and République, of which we gave particulars of the trials last year, are in commission. The four remaining battleships of the 1900 programme have passed through their trials, and are either in commission or will be in commission very shortly. The Vérité was launched from the Chantiers de la Gironde, at Bordeaux, on May 28th, all her armour, turrets, and machinery in place, her launching weight being 12,250 tons. The other ships were launched in the previous year. The following are the results of their trials, taken mainly from the *Yacht*:—

Name.	24 Hours' Trial.			Full Power.		
	I.H.P.	Speed.	Coal.	I.H.P.	Speed.	Coal.
		kts.	lbs.		kts.	lbs.
Démocratie	11,472	17·35	1·48	19,190	19·44	—
Justice	11,530	17·94	1·52	18,548	19·43	1·9
Liberté	11,624	17·37	1·43	20,565	19·31	—
Vérité	11,483	17·5*	1·46	20,433	19·26	—

* Approximate.

On the 24 hours' trial at 10,500 I.H.P. the coal consumption was not to exceed (750 grs.) 1·62 lbs. per I.H.P. per hour; on the full-power trial the contract speed was 18 knots with 18,000 I.H.P. Both as regards coal consumption and speed all these ships have therefore done better than was estimated.

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The Patrie was sent on a four days' trial in the Mediterranean in June. For two days a speed of 17·5 knots was maintained without difficulty in the engine-room or stokehold. The trials were then interrupted owing to the entry of salt into one of the condensers.

Battleships.

Of the six new battleships of the 1906 programme, the Danton is building at Brest, the Mirabeau at Lorient, and these are to be completed at the end of 1910. The Voltaire was laid down at La Seyne on June 8th, 1907; the Vergniaud is building at the Chantiers de la Gironde, Bordeaux; the Diderot and Condorcet are building at the Chantiers de la Loire and the Chantiers de Penhoët, St. Nazaire. These four ships are to be ready for commission in 1911. In a discussion raised by M. Fleury-Ravarin, in the Senate, on February 7th, 1908, on types of boilers, the Minister of Marine stated that the adoption of 12-in. guns of the 1906 model, and an improved type of turret, had absorbed the reserve displacement of 200 tons, and that the choice of boilers was therefore limited to Belleville, Niclausse, or similar types—excluding the Babcock and Wilcox, which were heavier. The boilers of these ships had not been ordered at the time of the discussion—a good illustration of the cause of the delays in the construction of so many French ships.

No battleships are to be laid down in 1908, but six are proposed for 1909 and 1910 by the Superior Council of the Navy with a displacement of about 20,000 tons, 20 knots speed, and an armament of six 12-in., eight 9·4-in., and eighteen 3·9-in. guns. The duality of calibre and other features of the plans have been much criticised.

Armoured cruisers.

The armoured cruiser Jules Ferry, like the Patrie, was sent on a special long-distance trial last year. For 72 hours a speed of 20 knots was maintained with 17,000 I.H.P.

The Victor Hugo, sister ship to the Jules Ferry and the Léon Gambetta, has at last completed her trials, which were interrupted in 1906. Displacement, 12,351 tons; designed speed, 22 knots with 27,500 I.H.P. On the full-power trial the Victor Hugo attained a mean speed of 22·5 knots with 28,486 I.H.P., as compared with the 23·06 knots attained by the Léon Gambetta and 22·8 knots by the Jules Ferry.

The armoured cruiser Jules Michelet is nearly ready for her trials at Brest, and the Ernest Renan at Toulon. Both are of the programme of 1900.

The armoured cruiser Edgard Quinet, which was laid down in August, 1904, was launched at Brest on September 21st, 1907. The sister ship, Waldeck-Rousseau, was launched on March 4th, 1908, at Lorient. Displacement, 13,780 tons; estimated speed, 23 knots with 36,000 I.H.P. The armament comprises fourteen 7·6-in. guns, as

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compared with four 9·2-in. and ten 7·5-in. guns of the Minotaur class, which are of about the same size. The armament of the Edgard Quinet is disposed as follows:—Four 7·6-in. guns in turrets on the centre line; four in casemates, and six mounted singly in turrets. The turrets are protected by 8-in. armour, and the casemates by 4·7-in. armour. The end-on fire is very powerful: eight 7·6-in. guns can fire ahead or astern. Protection is afforded by a 6·7-in. belt rising 8 ft. 6 in. above the water-line, and extending 4 ft. 8 in. below the water-line amidships. Lighter armour is carried to a height of 17 ft. above the water-line forward. There are two armoured decks at the upper and lower edge of the belt. The upper deck is ¾ in. to 1¼ in., the lower 1¾ in. to 2½ in. thick. The Quinet has three vertical triple expansion engines and Belleville boilers. The total coal capacity is 2300 tons, which gives a range of action of 11,000 miles. The complement comprises 30 officers and 708 men. Both the Quinet and the Waldeck-Rousseau will be ready for commission in 1910.

No armoured cruisers or protected cruisers are included in the programme for 1908.

Torpedo flotilla.

During the year under review one destroyer, the Obusier, has been commissioned, while the Branlebas, Mortier, Fleuret, and Coutelas have been through their trials, attaining a speed of from 28 to 30 knots. The Carquois, Cognée, Fanfare, Gabion, Hache, Pierrier, Sape, and Trident have been launched. In addition to these, it is estimated that the Sabretache, Oriflamme, Etendard, Fanion, Spahi, and Massue will be delivered before the end of 1908.

Several torpedo-boats of 100 tons displacement have been delivered. Fifteen destroyers, but no new torpedo-boats are included in the programme for 1908.

It has been observed that French destroyers (*contre-torpilleurs*) have up to the present time been equivalent only to the sea-going torpedo-boats of some other Powers. They have approximated to 280 tons, and may be accounted equal to our coastal torpedo-boat destroyers, which are now known as first-class torpedo-boats The French vessels more recently laid down have certainly marked some progress, but still show hesitation in type. These new boats vary between 410 and 450 tons, and their speed is to be 28 knots. Instead of carrying one 9-pdr. and six 3-pdrs., they will be armed with six 9-pdrs. The speed of 28 knots seems insufficient in view of what is being done in other countries; and if French destroyers are slower than foreign destroyers, and not so numerous, they will be placed at a disadvantage.

Sub-marines.

The year 1907–08 has been one of some activity in the construction of submarine vessels. The submersibles Pluviôse, Ventôse,

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Circé, and Calypso have been launched, as well as the submarine Rubis. Under construction in 1908, or under orders to be laid down, will be, in addition to the above, fifty-one submarines and submersibles—Q 53 to Q 104—which are intended to be completed before the end of 1911. (Q 101 to Q 104 are of the programme of 1908.) Considerable dissatisfaction has been expressed at the slow progress made with the construction of submarine boats. The trials of the vessels named have not made much progress. Inquiry shows that, though a great many vessels are in hand or provided for, not a single submarine was completed for service either in 1906 or 1907. In 1903 the Omega and six submarines of the Emeraude class were begun; but the Emeraude and Opale, though launched in 1906, are still under trial, and their machinery has given a good deal of trouble. The Rubis remains uncompleted, and three others at Toulon are still on the stocks, more than four years after the order to lay them down. These vessels will have been six years under construction when they are completed; and the case of the Omega will be worse, because no decision has been arrived at as to what kind of engines she is to receive. In 1904 only the submersibles Circé and Calypso, referred to above, were put in hand. In 1905 eighteen submarine vessels were begun, but only four of them have been launched. One of these is the Ventôse, whose trials were interrupted by an explosion which destroyed her electric accumulators. In 1906 sixteen submersibles were to be laid down; but negotiations are still in progress for the provision of the materials, and the designs have been modified. The result is that not one of them is really in hand. In the same year four large submersibles were ordered of from 500 to 800 tons, and it is possible that these may be pushed on more rapidly. In 1907 the Minister ordered ten submersibles of the Pluviôse type modified; but the sketch plans are only just begun, and there is no certainty when they will be put in hand. It thus appears that of fifty-three submarines and submersibles laid down from 1903 to 1907 not one has been completed for service, though four are under trial and six others have been launched, the rest being in hand or existing only on paper.

A review of French naval construction, in regard to torpedo craft, shows that there is a tendency for the flotilla to become confined in the future to destroyers and submarines of larger type.

Ships lost.

The French Navy has suffered several losses during the year under review. The battleship Iéna, which was seriously damaged by an explosion in her powder magazines while in dock at Toulon, will not be repaired. The old armoured cruiser Chanzy (4736 tons displacement), which was wrecked in China in May, 1907, and the

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protected cruiser Jean Bart, which was wrecked on the west coast of Africa in February, 1907, became a total loss.

Inquiries into explosion on Iéna.

The disaster by which the Iéna was destroyed created a profound impression, not only in Naval circles, but throughout France, and there have been technical and other inquiries into the cause of it, while two committee reports have been presented to Parliament, one prepared by the Chamber reporter and the other by the reporter to the Senate. The committee appointed by the Chamber arrived at no definite conclusion. There was not sufficient evidence to enable its members to ascribe the disaster either to the B powder or to any other definite cause. M. Michel, the reporter, was himself convinced that the B powder was the real cause, but the committee did not sanction this conclusion. The committee demanded that the black powder should be definitely suppressed, and that the manufacture of B powder should be improved, with the object of attaining greater stability and regularity in fire. M. Monis was the reporter upon this question in the Senate, and his committee came to the conclusion that the explosion was not caused by any accidental circumstance, such as a short circuit or Hertzian waves. It was attributable only, said the committee, to the decomposition of the B powder, which might have been caused by the magazine being under the compartment containing the dynamos and by want of proper refrigerating apparatus, or, again, by some 80 per cent. of the powder being more than six years old. It was remarked, however, after all the inquiries, that the real cause remained hidden. As to the allegation that it was due to malevolence on the part of someone on board, M. Thomson declared there was no evidence whatever for the suggestion.

The technical authorities responsible for the manufacture of the B powder defended it resolutely. Colonel Marsat, President of the Gâvres Committee, declared that the B powder was incapable of spontaneous explosion, and showed mathematically that this was impossible. General Gossot, Director of Artillery, M. Vieille, the eminent chemist, and other authorities, admitted the possibility, but thought that serious consequences could not result. On the other hand there was considerable doubt with regard to the B powder afloat and no little anxiety. Captain Lepidi, chief of the explosives section, declared that there was no guarantee, with existing powders, that disaster would not occur. "I do not say that all our ships will blow up to-morrow, but all of them may blow up." The anxiety which arose in consequence in the Navy has since been allayed. On the night of July 28th a sample of this explosive burst into flames spontaneously while under observation of the committee, and other trials took place at Gâvres in August. It is believed that these

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finally demonstrated the danger of B powder, and also the fact that, if it is properly stored in magazines kept at the right temperature, and is not allowed to grow old, no danger can result. In this country and in Germany large quantities of old explosives have been destroyed, and undoubtedly old stocks will not be supplied to French men-of-war in the future. These are the considerations that have allayed the alarm that was caused by the terrible disaster to the Iéna.

Ship struck off the list.

The British policy of condemning obsolete ships has been vigorously imitated during the past year in France. The Minister of Marine has struck off the list the battleships Baudin, Formidable, Courbet, Dévastation, Magenta, and Neptune; the coast-defence ships Fulminant and Terrible; the third-class cruiser Troude; the torpedo cruisers Condor, Fleurus, and Wattignies, of which the Condor has been sold; and the torpedo gunboats Leger and Levrier. M. Poirrier recommends in his report that several third-class cruisers and older torpedo boats should also be removed from the Navy; while a writer in the *Yacht*, who agrees in the condemnation of the older battleships, urges that the armoured gunboats of the Achéron type should be struck off the list in preference to protected cruisers, which can still render useful service. The Achéron class are, however, still considered by the Department to be of some value for local defence.

The new entrance to the port of St. Nazaire has been completed at a cost of £800,000.

Cost of construction.

M. Poirrier gives some interesting figures in his report of the comparative cost of construction of armour, and of machinery and boilers, in France and other countries. Steel plates in France cost 24·50 francs, in England 19 to 20 francs per 100 kilos. Armour costs 2600 francs per ton in France, and 1700 to 1800 francs per ton in the United States. Machinery and boilers cost less per I.H.P. in France than in England; but any advantage in cost of construction under this head is more than counterbalanced by the higher price that has to be paid for armour, and the materials used in construction. The cost per ton of warships has increased in all countries. The cost per ton of the battleships of the Patrie class (2800 francs) is 30 per cent. more than that of the Gaulois, Iéna, and Suffren, which cost 2130 to 2200 francs. The cost of the British Queen class was 1700 francs per ton, and of the King Edward class 2017 francs per ton, while the German battleship Pommern cost 2240 francs per ton. M. Poirrier suggests the possibility of placing orders abroad if the prices demanded by French makers of war material are too high, while at the same time he urges that more work should be given to contractors and less done in Government establishments.

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GERMANY.

The German Navy made steady progress during the year 1907, but the work in preparation for laying down the ships voted in 1906 and 1907 was conducted in secrecy, and few reliable particulars are available. The commencement of the two ships of the 1906 programme, the Ersatz Bayern and the Ersatz Sachsen, was delayed more than a year—a circumstance which has not surprised anyone in this country—and only one has been launched. The two ships of 1907, Ersatz Württemberg and Ersatz Baden, are said to have actually been laid down. "Nauticus," the German handbook, believes that these four ships will be completed by the appointed dates. The Schlesien and Schleswig-Holstein, the last ships of the Deutschland class, and the large cruiser Gneisenau are approaching completion. The Hannover and Pommern have completed their trials and have joined the high sea fleet. The ships of the Brandenburg class have been removed from the first line of the Fleet and, with the Siegfried class, constitute the Reserve battle fleet. The ships of the Kaiser class are to be partially reconstructed, and the work on the Kaiser Barbarossa has been completed.

Amendments to Navy Act.

The Bill amending the Navy Act, by reducing the period in which each battleship has to be replaced from 25 years to 20 years, has been passed. The first table given below shows the programme under the Navy Law of 1900 and the "Novelle" of 1906. The second gives the programme according to the amendment of 1908. The object is to increase the total strength to 38 battleships, 20 large cruisers, 38 small cruisers, and 144 torpedo craft.

LAW OF 1900 AND NOVELLE 1906.

	Battleships.	Large Cruisers.	Small Cruisers.
1908 . .	2	1	2
1909 . .	2	1	2
1910 . .	2	1	2
1911 . .	1	1	2
1912 . .	1	2	2
1913 . .	1	1	2
1914 . .	1	1	2
1915 . .	1	1	2
1916 . .	1	1	2
1917 . .	2	—	2
	14	10	20

AMENDED LAW, 1908.

	Battleships.	Large Cruisers.	Small Cruisers.
1908 . .	3	1A	2
1909 . .	3	1A	2
1910 . .	3	1A	2
1911 . .	2+1A	1A	2
1912 . .	1	1	2
1913 . .	1	1	2
1914 . .	1	1	2
1915 . .	1	1	2
1916 . .	1	1	2
1917 . .	1	1	1+1A
	18	10	20

A = Additional ships.

Admiral von Tirpitz upon.

In the discussion of the Bill in the Budget Committee of the Reichstag in December, Admiral von Tirpitz repeated his previous statements to the effect that the more rapid modernisation of the

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battleship fleet had been forced upon Germany by the naval policy of other Powers. Without adequate naval forces at command the German Empire would be compelled to retire from the arena of world politics. It was imperative that other Powers should realise that it was more advantageous to come to terms with Germany than to make war upon her. While he appreciated the activity of the Navy League, he deprecated any attempt to dictate to the Government. In particular, Admiral von Tirpitz expressed himself as being personally in favour of a still more rapid rate of construction, but, as a matter of fact, battleships were already being built more rapidly in Germany than in France and America, and possibly as rapidly as in England. The chief obstacle in the way of more rapid construction was the difficulty of obtaining the requisite supply of armour plates and guns.

Herr Bebel warned the Government that the pursuit of reckless armaments would lead to a catastrophe, and he further predicted the introduction of additional proposals for the period after 1912. The National Liberal Representatives in the discussion, it should be noted, urged that additional battleships should be provided in the programme of construction for 1912–1917 for replacing ships of the Kaiser and Wittelsbach classes which were becoming obsolete.

In a further speech delivered at the end of January, Admiral von Tirpitz gave the most emphatic contradiction to Herr Bebel's allegation that the Bill had caused uneasiness in England. As the *Times* remarked in a leading article on the speech, though the British people are not uneasy they "are quite alive to the significance of the Bill and firmly resolve to frame their own action accordingly." The new Bill considerably increases the number of battleships to be laid down during the early years of the programme and undoubtedly demands that measures be taken for the British Navy to meet this increase. It is highly improbable, if we may judge from past experience, that the limit placed on new construction in the last years covered by the present programme will be adhered to.

Significance of the amendments.

The decision to reduce the age limit of German warships, implying an acceleration of the rate of warship building, followed a long agitation, conducted by the German Navy League. It has been accepted by the extremists as a measure temporarily satisfactory. It assures the future of the Navy, and raises a barrier against influences of party politics. But it can be accepted only with the reserve, said *Ueberall* —which expresses the extreme view of the Navy League—that it must be amended, in view of larger responsibilities which will become evident in the future. The Navy, remarked this publication, is not built to satisfy national pride, or even as a defence against attack,

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but as the means and support of larger politics. It is the wall behind which the industrial strength of the German people is developed, the foundation upon which commercial policy is based, and the means whereby the people will prosper and be assured of their food supplies. It is the cause, in most cases, of political and social success throughout the world, and the force which lies behind the working of international policy. "Let us remember Morocco, and Algeciras, and Casablanca; let us remember Akaba and the Far East—it is everywhere the same case, and everywhere the same failure." More recently in the same publication Count Reventlow has urged the Government to introduce a stronger measure.

It is worthy of remark that German warships under the Act of 1900, and under the amendment recently adopted, by virtue of which ships are to be replaced after twenty years, count their age from the year in which the first instalment is voted for their building to that in which the first instalment is granted for the building of the ships that are to replace them.

Estimates 1908.

The Estimates for 1908 amount to £16,603,444, an increase of nearly £3,000,000 on the Estimates of 1907. The vote for new construction amounts to £5,596,185, an increase of £1,393,000 over the amount voted in 1907. The vote for armaments (including torpedoes and mines) is increased by £690,000 to £2,774,351. The total expenditure on new construction and armaments in 1908 is £8,370,536, an increase of £2,082,234 over the Estimates of 1907. There are also increases in the pay of officers and men and other votes, while additional expenditure is contemplated on coast fortifications and on the construction of docks. £669,700 are to be spent in 1908 on improvements and extensions of the dockyards at Wilhelmshaven and Kiel. A first instalment for the construction of a new dry dock at Brunsbüttel (the total cost of which will be £1,500,000) is provided in the Estimates, while the vote for the expenditure of £1,500,000 on the construction of a harbour at Heligoland has been carried. Under the Estimates of the Home Office £1,000,000 is to be spent in 1908 for the widening of the Kiel Canal, or £250,000 more than in 1907. It is proposed to make Wilhelmshaven a battleship station. This will necessitate considerable expenditure, and the improvement and deepening of the approaches to the port.

New construction in 1908.

There are to be laid down in 1908 three battleships to replace the Oldenburg, the Siegfried, and the Beowulf; one large cruiser, G; two small cruisers, the Ersatz Schwalbe and Ersatz Sperber; a river gunboat for China; and twelve destroyers; while £342,000 are to be spent on the construction of and experiments with submarines.

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Battleships completed.

Two other battleships of the Deutschland class (13,200 tons) have been completed. The Pommern attained a speed of 19·21 knots with 20,400 I.H.P., and on a twenty-four hours' coal consumption trial attained a mean speed of 10·8 knots with 3464 I.H.P. and a coal consumption of 1·56 lbs. per I.H.P per hour. The Hannover, on December 6th, 1907, in a trial in deep water, attained 19·16 knots with 22,492 I.H.P.; on a twenty-four hours' trial on December 11th, 16·9 knots with 12,153 I.H.P. Particulars of the trials of the Deutschland were given last year. The estimated speed with 16,000 I.H.P. was 18 knots. Two other ships of the same class are under construction, the Schleswig-Holstein at Kiel, and the Schlesien at Dantzig; both were launched in 1906.

Ersatz Bayern class.

The displacement of the Ersatz Bayern and Ersatz Sachsen, building at Wilhelmshaven and Bremen, is 17,679 tons, and of the Ersatz Baden and Ersatz Württemberg, of the 1907 programme, recently laid down at the Germania Yard, Kiel, and the Vulcan Yard, Stettin, 18,307 tons. Protection is afforded by a belt 12 inches thick amidships tapering to 4 inches at the bows and at the stern. The turrets are protected by 11-in. armour. It has been freely stated that the main armament will consist of sixteen 11-in. guns distributed, according to a plan given in the "Pola Almanack," as follows:—Four in pairs in turrets on the centre line forward and aft; the remaining twelve mounted in threes in turrets, of which two are on the centre line forward and aft, so that the guns can be fired over the top of the other turrets, and two are placed diagonally amidships. This disposition of the armament is very improbable. It is far more likely that the armament will comprise not more than twelve 11-in. guns together with twelve 6·6-in. guns, a certain number of 3·4-in. guns, and six submerged torpedo tubes. The Ersatz Bayern and the Ersatz Sachsen will be fitted with turbine machinery, and the latest reports give the estimated speed as 19 knots with 25,000 I.H.P. The range of action at 10 knots is given as 5500 miles.

Launch of Ersatz Bayern.

The Ersatz Bayern was launched at Wilhelmshaven on March 7 in the presence of the Emperor, and received the name of Nassau. It was claimed for her that a shipbuilding record had been established in Germany, in that she had been on the stocks only seven and a half months, and had been constructed without overtime. Orders were given in the autumn of 1906 for the laying down of the ship, but considerable changes were made in the plans, and she was not actually laid down until July 22, 1907. Before this date, however, great quantities of materials were assembled, as is always done in the case of ships, such as the Dreadnought, with which it is desired to establish a record.

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Rate of construction.

The Braunschweig and Elsass were on the stocks fourteen and seventeen months respectively, while the Hannover, one of the latest battleships built at the Imperial Dockyard, Wilhelmshaven, was twenty months completing afloat. The total time occupied in the construction of the Wettin, Wittelsbach, and Zähringen varied from thirty-eight to forty-one months, as compared with thirty-two to thirty-six months for the Africa, Hibernia, and Britannia, and thirty-four months for the Lord Nelson. The Dreadnought was completed in about sixteen months, but this rate of construction could only be attained in very special cases. It is probable that the Nassau will be completed in under thirty-six months; she may be completed in thirty months or less. The obstacle to more rapid construction in Germany is not, as will be gathered from the reports below, in the shipyards, but in the establishments producing the material of all kinds used in the production of a modern battleship. It is very doubtful whether the guns and mountings for more than one of the Nassau class will be ready this year. There have also been delays in the delivery of heavy castings and parts of machinery.

Armoured cruisers. Scharnhorst.

The armoured cruiser Scharnhorst, of 11,420 tons displacement, has been completed. She is said to have attained a speed of 24 knots on her trials with 28,000 I.H.P., the designed speed being 22·5 knots with 26,000 I.H.P. The Scharnhorst struck the bottom during her trials and has been sent to a private yard for repairs. Her sister ship, the Gneisenau, which was launched in 1906, has attained a speed of 23·8 knots on her trials.

Blücher.

No certain particulars have yet been published of the armoured cruiser Blücher, of 15,000 tons displacement, launched April 11, 1908, at the Imperial Dockyard, Kiel. The armament has been reported to comprise ten 11-in. guns, of which four are mounted in pairs in turrets on the centre line forward and aft, four in pairs in turrets on either side forward, and two singly in the after turrets on either side. It is highly improbable that a cruiser of 15,000 tons displacement will carry more than six or at most eight 11-in. guns. The minor armament will possibly include twenty 3·4-in. guns, and there will be three torpedo tubes. The belt has a maximum thickness of 6 inches. The estimated speed is 22·5 knots with 35,000 H.P. Cruiser E is nearly ready for launching.

Cruisers F and G.

Cruiser F, of the programme of 1907, has been laid down at the yard of Messrs. Blohm and Voss, Hamburg. The cost is given at £1,800,000, and the ship will be fitted with Parsons turbines. The following particulars are uncertain: Displacement, about 17,000 tons. Main armament, ten or twelve 11-in. guns. Estimated speed 25 knots with 40,000–50,000 I.H.P. A first instalment for

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the construction of the large cruiser G is taken in the Estimates of 1908.

Small cruisers.

The Stettin (3396 tons displacement), built at the Vulcan Yard, attained a mean speed of 25·8 knots on a preliminary trial when she was not down to her full-load draught. At the latter her speed with 13,584 I.H.P. was 23·3 knots. The Nürnberg and Stuttgart, sister ships to the Stettin, which were launched in 1906, have also been completed. The Ersatz Comet was launched on the 5th of October, 1907, from the yard of Messrs. Blohm and Voss, and has been named the Dresden. The Ersatz Pfeil is under construction at Danzig. The Ersatz Greif and Ersatz Jagd were laid down in 1907 at the Schichau Yard, Danzig, and Vulcan Yard, Stettin, respectively. Two small cruisers, the Ersatz Schwalbe and Ersatz Sperber, are included in the programme for 1908. A vote of £48,000 is taken in the Estimates of 1908 for the alteration of small cruisers.

Torpedo flotilla.

The first destroyers of the group V 150 to V 161, viz., 150, 151 and 155, have been launched at the Vulcan Yard, Stettin. Displacement, 670 tons. Speed, 30 knots with 10,500 I.H.P. Fuel is carried sufficient to enable them to steam 2000 miles.

G 137, which has a displacement of 570 tons, attained on her official trials a speed of over 32 knots, or two knots more than the contract speed. She is fitted with Parsons turbine engines.

On December 15th eight recent and some of the newer destroyers of the S, G, and V classes arrived at Cuxhaven, with the object of making a comparative endurance trial under severe weather conditions. The S boats were 115, 125, 127, and 139; the G boats 109, 136, and 137; and the V boat was 150, the first of a new class. These destroyers, under the convoy of the München, made their comparative run in the North Sea, apparently with success. The wind had great force, but a storm from the N.E., forecast by the Meteorological Office, did not arrive. The S boats (420 and 478 tons) had a contract speed of 28 knots, and S 125 was the first German turbine destroyer with a speed of 29·5 knots. The G boats (400 tons and 570 tons) had a speed of 28 and 30 knots; and the V boat, the first of a series of six built and building at the Vulcan Yard, had a speed of 30 knots. The eight boats cruised in heavy weather, five of them returning to Cuxhaven, and three to Wilhelmshaven. No particulars have been published concerning the actual results of these trials, but they were of great importance for an estimate of the sea-going qualities of the boats. They were intended to demonstrate the comparative value of the latest type.

Submarines.

The new submarine U 1 made a voyage from Heligoland to Kiel, a distance of 600 miles, under her own power. The vote for

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submarines is to be increased by about £200,000 in 1908 as compared with 1907.

Resources of private shipyards.

In the chapter by Mr. Bashford in the *Naval Annual* of 1905, some description was given of the resources of the private shipbuilding yards of Germany. These resources have since been increased. Count E. Reventlow, in March 1907, procured from the German private yards a statement of their facilities for the building of "capital" ships, and the following are the particulars given by him in his brochure, "Weltfrieden oder Weltkrieg! Wohin geht Deutschlands Weg?" The Vulcan Company, of Stettin, claim that they could lay down every year two battleships of 18,000 tons and two cruisers of 15,000 tons, which could be completed in from two to two and a half years, provided that guns and armour were promptly delivered. When the new yard of this company at Hamburg has been opened, the capacity will be increased from 50 to 75 per cent. Messrs. Blohm and Voss, of Hamburg, estimated that they could lay down every year two large ships—either battleships or cruisers—and could deliver them within two to two and a half years if guns and armour were ready and plans were not altered. Messrs. Schichau estimated that their works at Danzig and Elbing were capable of accommodating four battleships of 18,000 tons each on the stocks, and of fitting out at the same time two or three more similar vessels. This firm could complete a battleship in two and a half years, but would prefer not to reduce the present completing period of three years to two and a half years. The Weser Shipbuilding Company, of Bremen, claim that it could lay down two battleships and two cruisers at once, and complete them within a period of from two to two and a half years. The Germania Yard at Kiel considered that it could reduce the building period of battleships and cruisers to twenty-four or thirty months, and having seven slips could lay down at least two per annum. The Howaldt Yard at Kiel also reported its ability to build a large cruiser in twenty-four months.

From the above statements it seems reasonable to conclude that the German private shipyards are capable of laying down thirteen or fourteen battleships or large cruisers annually, and of completing them within a period of two and a half to three years. At a time of national emergency it is probable that the period occupied in construction could be reduced from two and a half to two years.

Personnel.

The total numbers voted for the Navy in 1907 were 46,913. The numbers to be voted for in 1908 are increased to 50,323 by the addition of 153 officers and 3423 men.

By an order issued in June, 1907, the average age of entry for boys has been fixed at 15½ years, the limits being fixed at 14½ and

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18 years. 850 boys are to be entered. For the first six months they will be trained in the training ship König Wilhelm; the second six months they will go for a foreign cruise. After two years' service they will be rated as seamen.

ITALY.

Estimates.

The Navy Estimates for 1908–9 amount to £5,803,881, an increase of nearly £250,000 on the Estimates for the previous year. An additional credit of £400,000 has been voted for new construction, and a sum of £130,000 is provided for improvements in pay and for the addition of 1000 men. The total Naval Expenditure will thus exceed £6,000,000.

Battleships.

The battleships of the Regina Elena class have already been described in previous numbers of the *Naval Annual:* Displacement, 12,425 tons; speed, 22 knots, with 20,000 I.H.P.: armament, two 12-in. and twelve 8-in. guns. The Vittorio Emmanuele III and the Regina Elena, laid down in 1901, and launched in 1904, have been completed. The Roma, laid down at Spezia in September, 1903, was launched on April 21st, 1907. The Napoli, laid down in October, 1903, was launched in September, 1905. It will be observed that with the exception of the Napoli all these battleships were three years on the stocks before being launched. The lengthy period occupied in construction in Italian shipyards is nearly as bad as in those of France. By the time these four battleships are completed, eight years or more will have elapsed since the date of their design. It would be infinitely better policy for the Italian Administration to concentrate their energies on completing more rapidly ships once they have been laid down.

Armoured cruisers.

The armoured cruiser Pisa was launched on the 15th September, 1907, from Orlando's yard at Leghorn, and the San Giorgio at Castellamare in March, 1908. They are sister ships to the Amalfi and San Marco, and to B, the latter also under construction at Leghorn. The Pisa, Amalfi and B were built on speculation by the Terni combine. The two former have been bought by the Government; B is still on sale. The Pisa is to be in commission during the summer. Displacement, 9832 tons; estimated speed, 22·5 knots at 18,000 I.H.P. The armament comprises four 10-in., eight 8-in. (Vickers' type, 45 calibres), and sixteen 3-in. guns. There are three torpedo tubes. Protection to the hull is afforded by an 8-in. belt, tapering to 3½-in. at the ends, by 7-in. armour on the side above the belt, and by 7-in. transverse bulkheads, while the gun positions are protected by 7–6-in. armour. These cruisers, like all recent Italian armoured cruisers, carry

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a powerful armament and are well protected for their size. Their speed is good and represents an advance of 2½ knots on that of their predecessors, the Francesco Ferruccio and Giuseppe Garibaldi. The Pisa is fitted with Belleville boilers with economisers which will develop 20,000 I.H.P., giving the ship a speed, it is reported, of 23 knots with forced draught, while with natural draught the speed will be 21 knots. The maximum coal capacity is 1600 tons, which will give the ship a range of action of 10,000 miles.

Programme.

The programme of new construction for 1908–9 provides for the construction of the battleships Roma, Napoli and A, and of the cruisers San Marco and San Giorgio, the payment by instalments for the purchase of the cruisers Pisa and Amalfi, the commencement of a sister ship to A, a scout, a submersible, a station vessel for South America, and two lake gunboats.

Ships struck off the list.

It has been decided to remove the battleships Francesco Morosini and Ruggiero di Lauria, the third-class cruiser Dogali, and other smaller vessels from the list. It is reported that the Duilio is to be broken up, and that the Dogali has been sold.

Submersibles.

In the construction of submersible boats Italy has taken a leading place. The Glauco and Squalo, designed by Engineer Laurenti, gave a most satisfactory proof of their capabilities during the manœuvres of 1906. Three other boats of the same type, the Narvalo, Otaria and Tricheco have been completed. Displacement on surface, 180 tons; submerged, 230 tons; speed on surface, 15 knots; submerged, 9 knots. A submersible of the new class is building at the Fiat San Giorgio establishment, Muggiano, Spezia. In an interesting article in the *Engineer* the advantages possessed by the Italian submersibles over their rivals are pointed out. (1) Their speed is 15 knots as compared with 12 knots of the French submersibles of 400 tons, and 13 knots of the British C Class. [The latest British types are to have a speed of 15 knots, but are of more than twice the displacement of the Italian boats.] (2) They possess a reserve of buoyancy of 60 per cent. as compared with 20 per cent. in the French Aigrette type, 22 per cent. in the Lake type, and about 10 per cent. in most boats of the Holland type. (3) They have greater stability. (4) They can be submerged at once and on an even keel. (5) Each unit of the accumulators weighs only 250 lb. as compared with 1,200 lb. in the Lake and Holland boats, and the danger of explosion is much reduced owing to the battery being hermetically sealed and the gases expelled outboard. (6) The Italian boats are unique in being sub-divided into eight separate water-tight compartments, thus diminishing the risk of the serious accidents which have occurred to English and French submarines.

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Gunnery. Great attention has been recently devoted to the improvement of gunnery in the Italian Navy. Gunlayers' tests and battle practice have been instituted, the former for testing the ability of the individual gunlayer, the latter for testing the efficiency of ships and squadrons. The result of the gunlayers' tests in 1907 show great progress over the previous year; 60 per cent. of the gunlayers obtained prizes, which means that the percentage of hits to rounds fired was over 75. In the gunlayers' tests the target was anchored, each ship steaming past it at 14 knots speed at a distance of from 2400 to 2700 mètres. In the battle practice there were two series of tests, one at 4000 metres at a target towed at the relative speed of 26 knots, and another at 6000 mètres at a drifting target. The target used in battle practice was 30 mètres long and 7 mètres high; that used for the gunlayers' tests was much smaller.

New gunnery school. A superior gunnery school for officers has been established in the Sardegna, as announced by the Minister of Marine at the distribution of gunnery prizes.

War college. There has also been instituted a War College (Scuola superiore di guerra Navale) with the object of cultivating naval thought on all questions relating to preparation for war. This school differs somewhat in conception from the German naval academy, the French superior school, and the war colleges of England or the United States. It is intended that the Italian war college shall secure the co-operation of all officers, irrespective of corps or rank, of pupils, and professors at the same time. Its objects will be secured by lectures, followed by discussions, and by a full use of the war game on new lines. The director of the school will be the chief of the general staff of the Navy, who will settle every year the subjects which are to be discussed and the place where meetings are to be held.

JAPAN.

Estimates. The ordinary Estimates for the financial year 1908–9 amount to £3,481,073, and the extraordinary Estimates to £4,613,812, being a total of £8,094,886, a reduction of £153,335 as compared with the year 1907–8. In the last-named year special credits were opened, covering the period up to 1913–14, for expenditure resulting from the war (£17,500,000) and the replacing of obsolete ships (£7,657,700). Owing, however, to financial stringency these special sums have been reduced, the former by £4,581,143, and the latter by £801,383. The moneys to be made available on these two accounts for new construction in 1908–9 will be £817,368 and £1,256,445, to which must be

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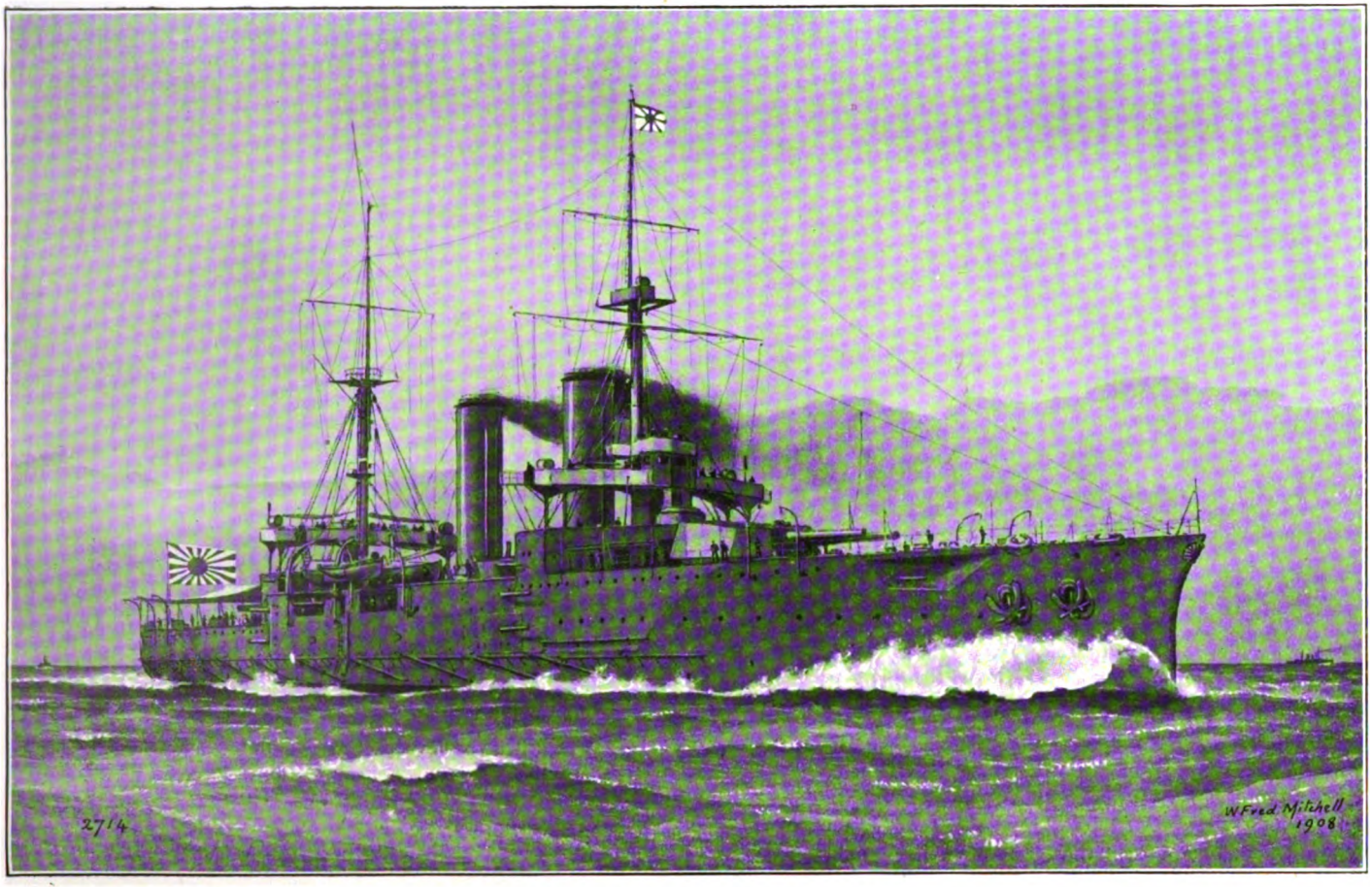

JAPANESE ARMOURED CRUISER TSUKUBA.

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added votes for the continuation of previous programmes £1,040,000, making a total of £3,113,813.

Battleships.

The battleships Aki, of 19,800 tons, and Satsuma, of 19,350 tons displacement, of which particulars were given last year, are approaching completion. The Satsuma was launched in December, 1906, at Yokosuka, and the Aki in April, 1907, at Kure. The Satsuma is driven by reciprocating engines and the Aki by turbine engines.

The battleship Mikasa, which was sunk in 1905, has been refitted; four 10-in. guns have been substituted for the four 6-in. guns on the upper deck. The Iwami (*ex* Orel) and Hizen (*ex* Retvizan) have been refitted; six 8-in. guns have been substituted for the 6-in. guns which they formerly carried. It is reported that in the Sagami and Suo four 12-in. have been substituted for four 10-in. guns.

No official programme of new construction has yet been published, but two battleships, of which the following particulars are possibly correct, are proposed. Displacement, 20,800 tons; length, 479 feet; beam, 85 ft. 6 in.; draught, 27 ft. 9 in.; speed, 20 knots; I.H.P., 26,500. The armament will, it is said, consist of twelve 12-in. and ten 6-in. guns. The maximum thickness of armour on the belt is 12 in. Both are to be driven by turbines.*

Armoured cruisers.

The armoured cruisers Tsukuba and Ikoma have been completed. The former paid a visit to England during the summer. Displacement, 13,750 tons; speed, 21 knots. The armament of the Tsukuba consists of four 12-in., twelve 6-in., and twelve 4·7-in. guns. The maximum thickness of the belt is 7 inches. The Ikoma at her full speed trials attained a mean speed of 20·43 knots.

The Kurama was launched at Yokosuka on October 21st, and the Ibuki at Kure on November 21st, 1907. The displacement of these ships is 14,620 tons, length between perpendiculars, 450 ft. 6 in.; length over all, 485 ft. 3 in.; beam, 75 ft. 6 in.; mean draught, 26 feet. The armament will probably comprise four 12-in., eight 8-in., and twelve 4·7-in. guns. The maximum thickness of the water-line belt is 7 inches, tapering to 4 inches at the ends, while the side above the belt amidships is protected by 5-in. armour. The armoured deck is 2 inches thick. The turrets of the 12-in. guns and the conning tower are protected by 9-in. armour. There are five torpedo tubes, of which four are submerged. The maximum coal supply is 2000 tons. The estimated speed is 22 knots with 25,000 H.P. The Kurama will have reciprocating engines, the Ibuki will be driven by Curtis turbines. Both will have Myabara boilers.

Two large cruiser-battleships are projected, of which the following

* *See* Plate 40 in Part II.

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particulars have been published. Displacement, 18,650 tons; I.H.P., 44,000; speed, 25 knots; armament, ten 12-in., some 6-in., and ten 4·7-in. guns.

A sister ship to the protected cruiser Tone, of 4035 tons displacement, has been launched.

Torpedo flotilla.

A large destroyer of 1100 tons displacement has been laid down in Japan. The designed speed is said to be 35 knots. Messrs. Vickers, Sons & Maxim have two submarines in hand for the Japanese Navy.

Explosion on Kashima.

A terrible explosion occurred in one of the turrets of the Kashima during target practice on September 16th, 1907, by which 34 officers and men lost their lives. The explosion appears to have been due to back fire from the previous round igniting the charge of powder which was about to be placed in the gun.

Ships removed from the list.

The old battleships Chin-yen and Fuso have been condemned, and it is reported that the protected cruisers Hashidate, Itsukushima, and Matsushima (completed in 1892–3), Naniwa and Takachiho (completed in 1886), Idzumi (1879), Takao (1889), Yayeyama (1889), and the torpedo gunboat Tatsuta have been removed from the active list.

Personnel.

The *personnel* of the Japanese Navy has been increased to over 40,000 officers and men, and is well up to the strength required to man the available ships.

Russia.

A reclassification of the Fleet has been made by Imperial orders, of which the following are the principal categories: (1) battleships; (2) armoured cruisers, it being intended presumably to build large vessels of this class; (3) cruisers, including the Admiral Makaroff, Bayan, and Pallada, of less than 8000 tons; (4) destroyers or sea-going torpedo boats, being boats of 300 tons or more; (5) torpedo boats, being small boats of less than 300 tons, but including the Grozovoi and Vlastny, as well as fifty-one numbered boats in the Baltic, twenty-three in the Black Sea, and eight in the Far East.

Battle-ships.

The battleship Pavel I. was launched at the Baltic yard, St. Petersburg, on September 7th, 1907. Her sister ship, the Andrei Pervozvannyi, was launched in October, 1906. Displacement, 17,200 tons.

Armoured cruisers.

The armoured cruiser Rurik, displacement 15,170 tons, which was launched at Barrow on November 17th, 1906, has completed her trials after some delay. No detailed particulars have been published, but it is said that the contract speed of 21 knots was attained on a 30 hours' trial.

The armoured cruiser Admiral Makaroff, which was launched at

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La Seyne in May, 1906, has also passed through her trials and attained a speed of 22·5 knots. The Bayan, of the same type, was launched on August 16th, 1907, at the new Admiralty yard, St. Petersburg, where the Pallada, also of the same class, launched in November, 1906, is completing. Displacement, 7900 tons; speed, 21 knots.

The armoured cruisers Gromoboi and Rossia, and the protected cruisers Oleg, Diana, and Aurora, have been under repair.

It is reported that two cruisers of 4500 tons displacement of the Varyag type have been ordered from the Nevski yard, and that ten destroyers are to be built within the next three years, at Nicolaieff, for the Black Sea Fleet.

Gunboats.

Two gunboats, the Sivoutch and Koreiets, have been launched, while the latter and the Gilyak have been brought forward for trials. The Bobr is still on the stocks.

On October 29 the destroyer Satzarenny, and on November 5, 1907, the Baranoff (700 tons) were launched at Nikolaieff, where ten others of the class are to be built. The Dostoiny and Deyatelny, the last of the boats to be put in hand at the Nevsky Yard at St. Petersburg, ran their trials in October. The former attained a mean speed of 25·8 knots and maximum of 26·4, and the latter respective speeds of 25·7 and 26·1 knots. The contract speed of this class is 26 knots.

Submarines.

The five submarines (of 400 tons) built at the Kreiton yard, St. Petersburg, have been named the Krokodil, Alligator, Kaiman, Drakon and Minoga. Displacement 400 tons. A submarine of 360 tons displacement is under construction at the Baltic yard. Three submarines built in Germany, of 240 tons displacement, the Karp, Karassi, and Kambala, have been delivered.

Ships struck off the list.

The battleships Tchesmé and Catharine II., launched in 1886, of the Black Sea Fleet, and the protected cruiser Pamyat Merkuriya, have been struck off the strength of the Navy.

Accidents.

Seven gunboats of the Siberian Flotilla were destroyed by fire at Strelensk. On November 15th a fire partially destroyed the Baltic yard. None of the ships under construction were destroyed with the exception of two gunboats.

New programme.

Various rumours have been current as to an extended programme of new construction contemplated by the Russian Admiralty, According to the *Times*, three programmes were laid by the Ministry of Marine before the Duma, one in which no new construction was proposed; the second proposing the expenditure of £45,000,000, spread over four years, and the laying down of four battleships. The third, which was approved by the government, proposed an ex-

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penditure of £200,000,000 in ten years. These plans, including the proposal to lay down two new battleships at St. Petersburg, were upset by the Defence Committee of the Duma and the Budget sub-committee which, sitting together on March 18th, rejected by 19 votes to 14 the credits for the new battleships, but approved those for new torpedo craft, as well as those for vessels under construction. The Committees reported that a comprehensive reconstruction of the Navy without a complete reorganisation of the administration was impossible. The Minister thereupon ordered an inspection of the Fleet and *personnel*, and an inquiry into the system of dockyard administration.*

United States.

President Roosevelt on the Navy.

President Roosevelt, in his message to Congress of December 3rd, 1907, made some important observations on the Naval policy of the United States, of which the following is a summary:—

It was hoped the Hague Conference might deal with the question of the limitation of armaments. But even before it had assembled informal inquiries had developed that as regards naval armaments, the only ones in which this country had any interest, it was hopeless to try to devise any plan for which there was the slightest possibility of securing the assent of the nations gathered at The Hague. No plan was even proposed which would have had the assent of more than one first-class Power outside of the United States. The only plan that seemed at all feasible, that of limiting the size of battleships, met with no favour at all. It is evident, therefore, that it is folly for this nation to base any hope of securing peace on any international agreement as to the limitation of armaments. Such being the fact, it would be most unwise for us to stop the upbuilding of our Navy. To build one battleship of the best and most advanced type a year would barely keep our Fleet up to its present force. This is not enough. In my judgment, we should this year provide for four battleships. But it is idle to build battleships unless, in addition to providing men and the means for thorough training, we provide the auxiliaries for them, unless we provide docks, the coaling stations, the colliers and supply ships that they need. We are extremely deficient in coaling stations and docks on the Pacific, and this deficiency should not longer be permitted to exist. Plenty of torpedo-boats and destroyers should be built. Both on the Atlantic and Pacific coasts, fortifications of the best type should be provided for all our greatest harbours.

We need always to remember that in time of war the Navy is not to be used to defend harbours and sea-coast cities; we should perfect our system of coast fortifications. The only efficient use for the Navy is for offence. The only way in which it can efficiently protect our own coast against the possible action of a foreign Navy is by destroying that foreign Navy. But the forts and the like are necessary so that the Navy may be footloose.

Until our Battle Fleet is much larger than at present it should never be split into detachments so far apart that they could not, in the event of emergency, be speedily united. Our coast line is on the Pacific just as much as on the Atlantic. The Battle Fleet should now and then be moved to the Pacific, just as at other times it should be kept in the Atlantic. When the Isthmian Canal is built the transit of the Battle Fleet from one ocean to the other will be comparatively easy. Until it is built I earnestly hope that the Battle Fleet will be thus shifted between the two oceans every year or two. The marksmanship on all our ships has improved phenomenally during the last five years. Until within the last two or three years it was not possible to train a Battle Fleet in squadron manœuvres under service conditions, and it is only during these last two or three years that the training under these conditions has become really effective. Another and most necessary stride in advance is now being taken. The Battle Fleet is about starting by the Straits of Magellan to visit the Pacific coast. No fleet of such size has ever made such a voyage, and it will be of very great educational use to all engaged in it.

* According to the latest reports the Navy Estimates for 1908 amount to £8,500,000, or about the same figure as in 1907.

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Battleships completed.

The battleship New Hampshire, of the Connecticut class, displacement 16,000 tons, which was launched on June 20th, 1906, is nearly completed. On the preliminary trials a speed of 18·14 knots was obtained. The Mississippi, of 13,000 tons displacement, is in commission, and her sister ship, the Idaho, should be completed before this volume is published. The Mississippi attained a speed of 17·11 knots on her full-power trials.

The battleships Michigan and South Carolina (programme 1905–6), of which a full description was given last year, have not made rapid progress. They were, by the end of February, advanced, the former to about 45 per cent., the latter to 39 per cent. of completion.

Battleships laid down.

The battleships Delaware and North Dakota, authorised by Congress in the Estimates for 1907, were commenced at the end of the year at the Newport News and Fore River yards respectively. Length, 510 ft.; beam, 85 ft.; displacement, 20,000 tons; speed, 21 knots. The armament comprises ten 12-in. and fourteen 5-in. guns. It is stated that the 12-in. guns will be in five turrets on the centre line of the ship. The maximum thickness of armour on the waterline belt and on the heavy gun positions is 11 in. The 5-in. guns are protected by 5-in. armour. The side above the waterline belt is protected for a height of 7 ft. by 10-in. armour. The ends of the ship are unarmoured. The maximum fuel supply is 2300 tons. The Delaware has turbine machinery, the North Dakota reciprocating engines.

Armoured cruisers.

The armoured cruiser North Carolina on her trials on February 15, 1908, attained a speed of 22·48 knots. Both the North Carolina and Montana should be completed during the summer. The other two ships of the class, the Tennessee and Washington, have been for some time in commission. No armoured cruisers are included in the programme of new construction.

Scouts.

The scout cruiser Birmingham was launched at the yard of the Fore River Shipbuilding Company on May 29th, 1907; the Chester at Bath, Maine, on June 27th; and the Salem at Fore River on July 27th. The estimated speed of these three vessels is 24 knots. They have in fact been specially designed for speed. The armament consists of only two 5-in. and six 3-in. guns, besides two submerged torpedo tubes. Displacement, fully loaded, 4640 tons; displacement on trial, 3750 tons. Their steaming range at 10 knots is 6250 miles, and in this respect they are superior to the British scouts. The Birmingham has vertical triple expansion engines, the Chester is fitted with Parsons turbines, while the Salem is the first ship in the United States Navy to be fitted with Curtis turbines. The Chester on the four hours' full-speed test made

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26·52 knots, and on the twenty-four hours' trial attained a speed of 22·8 knots.

Programme for 1908.

The Secretary of the Navy, in his Report, proposed the following programme of new construction for 1908:—

Number and Class.	Approximate Unit Cost.	Total Cost.
	£	£
4 battleships (of the same type as the Delaware class)	1,900,000	7,600,000
4 scout cruisers (of the same type as the Chester class)	500,000	2,000,000
10 destroyers (of the same type as those recently contracted for)	170,000	1,700,000
4 submarines (of the same type as those recommended as the result of the recent competitive tests, provided a more satisfactory type is not developed in the meantime)	76,000	304,000
1 ammunition ship	350,000	350,000
1 repair ship	400,000	400,000
2 mine-laying ships (conversion and equipment for that purpose of 2 cruisers now on the Navy list	50,000	100,000
4 Fleet colliers	350,000	1,400,000
Total		13,854,000

"It is true," says Secretary Metcalf, "that our Navy at the present time is the second in efficiency. Our position, however, is largely due to the fact that during the past fiscal year our sea strength and fighting efficiency have been increased by the completion and delivery of a number of new battleships and cruisers of the largest and most approved type, but we will not maintain this position very long unless Congress shall authorise the building of additional ships. It is of the highest importance that old and practically obsolete ships be replaced by ships of the newest type. It is pretty generally conceded that the battleship is the fighting machine, and it is also pretty generally conceded that the most effective battleship is the all-big-gun ship of the Delaware type. As compared with other Naval Powers, we are deficient in destroyers and submarines, and are also woefully deficient in colliers."

The Naval Appropriation Bill, as reported by the Committee to the House, after hearing the heads of departments, revealed a spirit of economy in a reduction of about £4,800,000 from the Estimates. Much was left for insertion by the Senate, with a possibility of greater liberality. The House Committee agreed to omit the scouts from the programme, and to provide only for two battleships of the Delaware class, with ten destroyers and eight submarines. It is uncertain whether the new ships will show any variation from the Delaware design. The bureau of steam engineering has not yet

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designed the machinery, which is proposed to be a duplication of that in the Delaware, but it is still a question whether reciprocating engines or turbines should be fitted. The general design will not have to be altered for the installation of the Curtis turbine, but if the Parsons type should be adopted, with its auxiliary machinery, giving economy of working at cruising speed, changes will have to be made. Probably the performances of the scout cruisers will be available before a decision is arrived at.

Voyage of Atlantic Fleet to the Pacific.

The most important event in the history of the United States Navy during the year under review is the despatch of the Atlantic Fleet, under the command of Rear-Admiral Evans, to the Pacific. The length of the voyage from San Francisco is 13,772 miles, and was expected to occupy 135 days, of which 60 days would be spent in port. As far as can be judged from the reports which have been published the voyage appears to have been made successfully at an average speed of about 10 knots. The Fleet consisted of the following sixteen battleships :—

Name.	Date of Launch.	Displacement.	Complement.	Speed.
Connecticut	1904	16,000	881	18·00
Kansas	1905	16,000	850	18·00
Louisiana	1904	16,000	881	18·00
Vermont	1905	16,000	881	18·00
Georgia	1904	14,948	812	19·26
New Jersey	1904	14,948	812	19·18
Rhode Island	1904	14,948	812	19·01
Virginia	1904	14,948	812	19·01
Minnesota	1905	16,000	881	18·00
Ohio	1901	12,500	800	17·82
Missouri	1901	12,500	779	18·15
Maine	1901	12,500	813	18·00
Alabama	1898	11,552	713	17·01
Illinois	1898	11,552	690	17·45
Kearsarge	1898	11,520	690	16·82
Kentucky	1898	11,520	686	16·90

Two supply ships and a repair ship accompanied the Battle Fleet. A torpedo flotilla was despatched separately. It was estimated that over 130,000 tons of coal would be consumed by the Fleet during the voyage. The Fleet on its arrival at San Francisco was joined by four Cruiser Squadrons, viz., the First Division of the United States Pacific Fleet, comprising the armoured cruisers Pennsylvania, West Virginia, Maryland and Colorado, from China. A second Cruiser Squadron consists of the armoured cruisers California and South Dakota, and the recently completed cruisers Tennessee and Washington, which were sent during the summer on a voyage across the Atlantic and back. The protected cruisers St. Louis, Charleston and Milwaukee

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form the third Cruiser Squadron; while the fourth consists of the protected cruisers Cincinnati, Raleigh, Albany and Yorktown. The fleet has been invited to visit Australia and Japan.

Accidents. A terrible accident occurred on board the Georgia during target practice on July 15th. Through a charge of powder becoming ignited as it was about to be placed in the gun, ten officers and men lost their lives and as many more were seriously injured. On June 22nd one of the 8-in. guns of the Colorado burst, but no one was injured. Since the commencement of 1903 there have been eight gunnery accidents in the United States Navy, resulting in the death of 55 officers and men.

Defences of Philippines. The joint Army and Navy Board has recommended the expenditure of about £2,000,000 on the defences of Manila and other ports in the Philippines. For Manila Bay six 14-in., one 10-in., four 6-in. and eight 3-in. guns, and eight 12-in. mortars are proposed; for Sulig Bay two 10-in., four 6-in., and eight 3-in. guns; for Pearl Harbour two 14-in., two 12-in. and four 3-in. guns, and sixteen 12-in. mortars; for Guantanamo six 12-in., four 6-in. and eight 3-in. guns, and eight 12-in. mortars.

Personnel. The *personnel* of the Navy has not been increased with sufficient rapidity to meet the demand for officers and men created by the large number of battleships and armoured cruisers recently completed. In a table attached to his report Secretary Metcalf gives the following figures:—Flag Officers, 22; Captains and Commanders, 209; other Line Officers and Engineers, 751; Medical Officers, 282; Paymasters, 210; Warrant Officers, 638; Enlisted Men, 34,062; Marine Officers, 277; Marines, 8147. The number of Flag Officers is far below the proportion adopted in most other Navies. There is apparently no difficulty in finding a sufficient number of recruits. Mr. Metcalf calls attention to the marked improvement of the enlisted *personnel* of the Navy, both as regards the general intelligence of the individual and his attention to duty. This improvement is credited largely to the earnest work of the recruiting service and to the fact that enlistments show an increasing proportion from the rural sections of the country. While the number received during the last fiscal year was satisfactory, the present fiscal year is expected to surpass all former years. There were enlisted from July 1st to November 1st, 1907, 6696, as against 4156 for the first four months of the preceding fiscal year. The enlisted men in service November 1, 1907, numbered 34,848. The applicants for enlistment during the fiscal year 1907 numbered 45,691, of whom 14,329 were accepted.

Engineer-in-Chief's report. Engineer-in-Chief C. W. Rae, Chief of the Bureau of Steam Engineering, in his report states that the plan of having all engineering duties performed by executive officers on board ships in commission

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has been a success, the practical education in engineering obtained at the Naval Academy being a fitting prelude to the care and manipulation of machinery. After detailing the qualifications required of Chief Engineers in the Dockyards, Inspectors of Machinery, Inspectors of Material and Designers of Machinery, Engineer-in-Chief Rae says:—

> That this work may be done, and done properly, officers with a natural bent for engineering should be encouraged to "specialise in engineering," and should be given the instruction necessary for them to attain that end. With this purpose in view, and after careful consideration of the subject, the Department in 1904 approved the joint report of the Chiefs of the Bureaus of Navigation, Steam Engineering, and Ordnance, which provided, among other things, that a certain number of young line officers should annually be detailed for instruction in engineering. Accordingly, a class was organised in the Bureau of Steam Engineering under the immediate direction of an officer of marked ability in engineering, and the results thus far secured have been so satisfactory as to reflect great credit upon the organisation of the class as well as upon the officers composing it. Unfortunately, the number assigned to this important work has never been large enough to meet the demands of the Service, and during the past year it was far below the number that should have been detailed. But it is upon this body of officers that the Department must look for the proper performance of the important duties enumerated in the preceding paragraphs; and as it is of the greatest importance that the Government should have among its officers a large number of specialists in engineering, just as it has its specialists in ordnance and torpedoes, it is earnestly recommended that this method of instruction be not only continued, but that the number of officers detailed for instruction be materially increased.
>
> Engineering knowledge is a necessity for the modern Naval officer, and the Navy must have engineers, no matter what they are called. To interrupt the present method of obtaining them would be, in the judgment of this Bureau, a retrograde movement, and one to be deplored.

It appears from the above that there is a difficulty in the United States Navy in getting a sufficient number of officers to specialise in engineering.

Attacks on Department.

A very remarkable attack has been made during recent months upon the organization of the United States Navy Department in a series of semi-independent bureaus, and the consequence of the system in the faulty construction of ships of war. The attack attracted great attention because of the resignation of Rear Admiral Brownson, chief of the Bureau of Navigation, and some very severe remarks of President Roosevelt which followed. It must be remembered, however, that the Rear Admiral did not resign as a consequence of the strictures passed upon the bureaus, but because of a difference of opinion as to the commissioning of the hospital ship Relief—whether she should be under Naval executive or medical command. The attack upon the department was led in *The Navy*, a professional monthly newspaper, by an article which pointed out the faults in design of many of the ships, and the few opportunities given to officers in the tactical handling of ships in divisions and squadrons. The voyage to the Pacific is partly an answer to the latter complaint. The attack was followed up by a severe article in *McClure's Magazine* by Mr. Henry Reuterdahl, which was reported to express the views of many officers of the Fleet. The points dealt with were sub-

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merged water-line armour, want of sufficient freeboard, inability to fight many of the guns in a heavy sea-way, open shafts of magazines, and open turrets and consequent dangers, imperfect protection for guns' crews, want of proper ammunition hoists, lack of torpedoes and destroyers, comparative seniority of officers, few opportunities for battle tactics, faults of bureau management, and other matters.

With reference to the resignation of Rear-Admiral Brownson, and in view of the attack upon the Department, President Roosevelt remarked that the Admiral's action, coupled with the various controversies among officers and their adherents, as to details of Naval construction and methods of training, had undoubtedly been prejudicial to the interests of the Navy, and might seriously impair the confidence essential for securing legislation sorely needed by the Navy. It was well, he said, that defects should be pointed out, but without exaggeration or malicious untruthfulness, and officers who were guilty of anything of the kind deserved the gravest rebuke.

The Navy Department made its defence in a report prepared by Admiral Converse covering all the points advanced in the criticism. Admiral Converse asserts that the ships and the material of the United States Navy are not inferior to those of foreign services. In relation to this report the *Army and Navy Gazette* said :—

> We had private information as to what the nature of this defence would be, and now it is known that it deals largely in technical matters, relating chiefly to the double-turret system as employed in the Kearsarge and Kentucky. This subject has caused immense controversy in the past in the United States Navy, and we should doubt if anything new is added by the latest particulars given. The critics of the Navy Department are described as "persons whose knowledge of the subject is limited or incorrect." It is admitted that mistakes may have been made, but they are declared to be very few. We do not think that the defects are of a serious character, but the chief point made by the critics of the Navy Department is that its organisation is not conducive to rapid appreciation of the requirements of modern warfare, that it leads to the reproduction of older types, and that in open turrets and waterline armour submerged there are defects such as do not exist in other Navies.

MINOR NAVIES.

Argentine Republic.

The plans for the reorganisation and expansion of the Fleet, presented in 1906, have been abandoned or indefinitely postponed.

Two gunboats, of 1000 tons displacement and 19 knots speed, are building at Elswick. Armament, two 6-in. howitzers, eight 75 mm. guns, six 76 mm. guns, and five rifle calibre guns. The machinery is being constructed by Messrs. Vickers.

Austria-Hungary.

Estimates.

The Navy Estimates for 1908 amount to £2,375,000, an increase of about £480,000 over the Estimates for 1907. It should be noted that the supplementary vote for new construction is exhausted.

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Battle-ships.

The Erzherzog Karl and Erzherzog Friedrich attained respectively speeds of 20·36 knots, with 17,986 I.H.P., and 20·56 knots, with 18,130 I.H.P., on their full-power trials. The estimated speed of these ships was 20·5 knots with 18,000 I.H.P. The Ferdinand Max, the third of the three battleships of the Erzherzog class, 10,433 tons displacement, attained a mean speed of 19·57 knots on her natural draught trials with 14,390 I.H.P. The Ferdinand Max has been placed in commission in the battleship squadron in place of the Babenberg. All the three ships named above are therefore now in commission.

Mention was made last year of three new battleships of 14,500 tons displacement and 20 knots speed. They are enlarged Erzherzogs. Two of them, the Tegetthoff and Rudolf, have been laid down at Trieste, and the third, the Stephanie, will be begun when the Tegetthoff has been launched. Length, 430 feet; beam, 82 feet; I.H.P., 20,000. The armament will comprise four 12-in., eight 9·4-in., and twenty 3·9-in. guns. A sum of £680,000 is allocated to the construction of these ships in 1908. Arrangements have been adopted in these as in other ships now under construction by which the vessel is prevented from heeling over if damaged on one side only.

Torpedo flotilla.

A torpedo cruiser, Ersatz Zara, has been laid down at Pola. Displacement, 3500 tons; I.H.P., 20,000; speed, 26 knots. She will be fitted with Yarrow boilers and Parsons turbines.

The six destroyers of the Huszar class have been completed, as also the fourteen torpedo boats of the Kaiman class, 200 tons. Of the latter the following are trial speeds:—Hai, 26·85 knots; Möwe and Schwalbe, 27·0 knots: Pinguin, 27·25 knots. Six additional destroyers and ten torpedo boats have been begun at Fiume. A floating dock for torpedo craft, to be completed within two years, has been put in hand at Pola.

Sub-marines.

Two submarines are being built by Messrs. Vickers at Barrow, four of the Lake type in Austria, at Pola, and Fiume, and two of 300 tons displacement have been ordered from the Germania yard, at Kiel.

Personnel.

In consequence of the completion of the new ships the recruit contingent has been increased from 2700 to 4000 men. A special telegraph corps, 184 strong, will be formed at the end of May, without adding to the numbers voted. Many changes are being made in the uniform for officers and men, especially in the cap and marks of rank.

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Brazil.

Battle-ships.

Three battleships are building for the Brazilian Navy, the Minas Geraes and Rio de Janeiro, at Elswick, and the São Paulo, at Barrow. Displacement, about 19,000 tons; speed, 21 knots. The armament comprises twelve 12-in., twenty-two 4·7-in., and eight 3-pr. guns. The 12-in. guns are distributed approximately as in the Dreadnought, except that there are two turrets on the centre-line forward as well as aft. The battleships building at Elswick will be launched in the spring.

Two scouts of 3000 tons displacement, and 26½ knots speed, are building at Elswick by Messrs. Armstrong, Whitworth & Company. They carry an armament of ten 4·7-in. and eight 1·8-in. guns, and two above-water torpedo tubes. The machinery for the three battleships and two scouts is being constructed by Messrs. Vickers at Barrow.

The first-class torpedo boat Goyaz has been completed by Messrs. Yarrow. Displacement, 150 tons. The mean speed attained for three hours was 26·49 knots. This vessel is driven by a combination of reciprocating engines and turbines. Others are in hand.

Two river gunboats have also been built by Messrs. Yarrow for the Brazilian Government and sent out to Rio Janeiro in sections.

Bulgaria.

Three 26 knots torpedo boats built in France have been put together at Varna.

China.

Six gunboats of 752 tons and one smaller are reported to have been completed in Japan. Four torpedo boats of 23 knots speed are also being built in Japan for the Chinese Navy.

Denmark.

Changes are being made in the armament of the coast defence armour-clad Iver Hvitfeldt, and in six gunboats. The Tordenskjold, Helgoland, and the armoured frigate Dänemark, have been struck off the list. A torpedo boat of 100-tons displacement and 26 knots speed has been delivered by Messrs. Normand.

Greece.

The total estimates amount to 14,570,000 drachmas.* Two torpedo boat destroyers, the Lonchi and Sfendoni, have been built by Messrs. Yarrow for the Greek Navy. Displacement, 350 tons; contract

* £582,800.

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speed, 31 knots; I.H.P., 5000. The Lonchi on her full speed trials attained a mean speed for three hours of 32·53 knots; on her coal endurance trial she steamed 35·9 miles for 1 ton of fuel at 14 knots speed, giving a radius of action of 3231 knots. The Thyella and Nauskratousa have also been launched. Of the same class, the Niki, Aspis, Doxa, and Velos have been launched at the Vulcan Yard, Stettin.

Mexico.

A transport of 1850 tons displacement was launched at Barrow on January 23, 1908. She is armed with six 4-in. and two 2·24-in. guns.

The Netherlands.

The net estimates amount to £1,252,025.

The Jacob van Heemskerck, which has not yet been launched, is the last ship of the programme of 1907. The Heemskerck has two 9·4-in., six 6-in., ten 12-pdrs., and smaller guns. Another vessel of the same class, enlarged to 6525 tons, is provided for in the Estimates of 1908. Armament proposed: two 11-in., four 6-in., and ten 12-pdr. guns. A programme of new construction is contemplated. The torpedo boat Zeeslang attained a speed of 24 knots on her trials.

Norway.

A programme for the construction of battleships of the Norge type, enlarged, is reported to be under consideration. Votes of £16,666 for the construction of a submarine (260 tons) by Krupp, of £27,777 for a destroyer, and £11,111 for the commencement of another destroyer, have been passed.

Roumania.

Four monitors of 600 tons displacement, constructed at Trieste, have been put together at Galatz, for service on the Danube. The armament consists of three 4·7-in. guns, in turrets. Three torpedo boats of 26 knots speed and eight vedette boats have also been delivered.

Spain.

The programme for the reorganisation of the Spanish Navy, which was adopted by the Cortes at the end of November, 1907, provides for a new shipbuilding programme, the placing of the arsenals on a new footing, and a revised organisation for the ministry and the *personnel* of the Fleet. The workshops and plant of the dockyards

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of Ferrol and Cadiz will be leased to Spanish private companies for the construction of large ships. In an article by Señor José Barbastro in the *Revista General de Marina*, February, 1908, was published an analysis of the Navy Estimates of 1908 compared with those of the two previous years. The Estimates for 1908 amount to £1,878,553, an increase of £419,866 on the Estimates for 1907. The form of the Estimates has been altered, and there is now an additional chapter devoted to new construction. For the building of new vessels by contract, a sum of £400,000 is set down; for gunboats and the completion of the vessels in hand, £118,000; for the reorganisation and fitting of the arsenals, £127,028, and for temporary services, £6000. The total amount of this additional chapter is £650,978, being an increase of £442,774 as compared with the expenditure of 1907. Señor Barbastro points out that, though the increase is great, it bears but a small proportion to the resources of the country, and that present and future outlay is the result of failure to spend money in the recent past. It appears that the Estimates for the Navy have been reduced by £109,410, as compared with the original proposal given in the *Gaceta* of June, 1907, resulting mainly from a reduction in the vote for building warships by contract. Señor Barbastro sees in this reduction upon the proposed Estimate signs of timidity and hesitation which are disquieting. The ships projected include three battleships of 15,000 tons, three destroyers or submarines, and twenty-four torpedo boats. The armoured cruiser Cataluña, launched in 1900, and the protected cruiser Reina Regente are at last to be completed.

SWEDEN.

At the beginning of 1907 a special committee reported upon the types and classes of vessels required for the Swedish Navy. The types indicated are battleships of 7500 tons (see below), scouts of 835 tons and 30 knots, destroyers of 430 tons and 30 knots, torpedo boats of 100 tons and 26 knots, submarines of 250 tons and 150 tons, mining vessels to be reconstructed, and gunboats. In the period 1909–13 about £430,000 will be expended yearly on new construction.

The coast defence battleship Oskar II., built at Gothenberg (4203 tons) has been completed.

The armoured cruiser Fylgia, of 4100 tons displacement, attained a speed of 22·5 knots on her trials, with 12,440 I.H.P. The designed speed was 21·5 knots, with 12,400 I.H.P. Protection is afforded by a belt of Krupp cemented steel, 4 in. thick, amidships, tapering to 2 in. forward and aft; forward the 2-in. armour is carried up to the main deck. The armament comprises eight 6-in. guns, which are

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mounted in four turrets, two on the centre line forward and aft, two on either side amidships; the turrets are protected by 5-in. armour. The light armament consists of fourteen 2·2-in. and three 1·4-in. quick-firers. The maximum coal supply is 900 tons, and is estimated to enable the ship to steam 8000 miles at 10 knots; the complement is 321. The Fylgia, with her good speed, is a useful little cruiser.

There are in hand two destroyers of which one, the Wale, has been launched, and six first-class torpedo boats and five smaller. Two submersible boats are projected, and one of the new Italian type is building at the Fiat Muggiano Yard, Spezia. In 1908 one destroyer and four first-class boats are to be built.

It is proposed to lay down two battleships of 7500 tons displacement, 17,500 I.H.P., speed 21 knots. Armament, four 11-in., four 7·6-in., eleven 4-in., and four 1·4-in. guns. The maximum thickness of the belt armour is 8 in. The maximum coal supply is 800 tons, or sufficient for 3000 miles at 10 knots. Complement, 450 officers and men. Cost, 13,450,000 kroner.

TURKEY.

The two torpedo cruisers, Peik-i-Shevket and the Berc-i-Satvet, were delivered in October, 1907, by the Germania yard, Kiel. Displacement, 740 tons. Contract speed, 22 knots, which was exceeded on trial. The armament comprises two 4-in., six 2·2-in., and two 1·6-in. guns.

The gunboat Mermeris, of 450 tons displacement, has been constructed at the Chantiers de la Loire, Nantes. Several torpedo craft are building in France and Italy.

URUGUAY.

The Italian cruiser Dogali has been purchased.

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CHAPTER III.

Comparative Strength.

The changes in the relative strength of Navies during the year under review are not so important as those chronicled in these pages for the year 1906–7, which witnessed the rise of the United States to the position, by a small margin over Germany, of the second Naval Power in the world. During the year 1907–8, two battleships have been completed in the United States, while two, as usual, have been completed in Germany. In battleship strength these two Navies are approximately equal, but in armoured cruisers the United States Navy has a very considerable superiority. Thanks to the completion of the four remaining battleships of the Patrie class—and no other Power has completed so many battleships in the past year—the position of the French Navy has improved. No ships have been completed for the Japanese Navy. For the Italian Navy two battleships of the Regina Elena class have been completed, and there are indications that the completion of the remaining two ships of the class will be proceeded with more vigorously. Amongst the minor Naval Powers the Navy of Austria-Hungary shows continuous and steady progress. For the British Navy two battleships only can be reckoned to have been completed.

Ships in commission. Britain.

The list of British, German and French Fleets in European waters as they will be constituted, according to the respective programmes, is given in the table opposite. The chief changes to note are the strengthening of the British Fleets in Home waters and of the French Navy in the Mediterranean, where the four battleships of the Patrie class completed during the year are being added to the Active Fleet. The following table shows the composition of certain of the fleets and squadrons in March, 1908, and indicates how far the programmes have already been carried into effect:—

British.			France: Mediterranean.	
Mediterranean.	Channel.	Home Fleet.	Active Squadron.	Reserve.
Queen	8 King Edwards	Dreadnought	Patrie	Bouvet
Prince of Wales	Venerable	Bulwark*	République	Masséna
Glory	Illustrious	London*	Suffren†	Charles Martel
Goliath	Swiftsure	Majestic	Charlemagne†	Jauréguiberry
Formidable*	Triumph	Cæsar	Gaulois†	Hoche
Implacable*	Ocean		St. Louis†	
	Vengeance			

* To be transferred to Channel. † To be transferred to Reserve Squadron.

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	GREAT BRITAIN.				GERMANY.	FRANCE.		
							Mediterranean.	
Class.	Mediterranean.	Atlantic Fleet.	Home Fleet.	Channel Fleet.	High Sea Fleet.	Northern Squadron.	Active Squadron.	Reserve.
Battleships	Queen Prince of Wales Glory Goliath 2 Canopus class	Exmouth Albemarle Cornwallis Duncan Russell Albion	Dreadnought Agamemnon Lord Nelson Magnificent Majestic Victorious	Edward VII. Africa Britannia Commonwealth Dominion Hibernia Hindustan New Zealand Bulwark Formidable Implacable Irresistible London Venerable	1st Squadron. Wittelsbach Zähringen Wettin Mecklenburg K. Karl der Grosse K. Wilhelm II. K. Wilhelm der Grosse K. Friedrich III. 2nd Squadron. Braunschweig Elsass Hessen Preussen Lothringen Deutschland Pommern Hannover	..	Patrie République Démocratie Justice Liberté Vérité	Suffren Bouvet Masséna Charlemagne Gaulois St. Louis
Cruisers, 1st Class	3rd Squadron. Bacchante Aboukir Lancaster Suffolk	2nd Squadron. Drake Antrim Carnarvon Devonshire	5th Squadron. Achilles Cochrane Natal Warrior Minotaur Shannon	1st Squadron. Good Hope Black Prince D. of Edinburgh Argyll Hampshire Roxburgh	Scharnhorst Gneisenau Roon Yorck	Léon Gambetta Amiral Aube Gueydon Dupetit-Thouars Marseillaise Jeanne d'Arc	Jules Ferry Victor Hugo	..
Cruisers, 2nd Class	Diana Minerva	Arrogant Venus	Dido Vindictive	Juno Talbot	..	Desaix Kléber	..	..
Cruisers, 3rd Class	Barham Philomel	..	Charybdis Topaze 2 Scouts	Diamond Sapphire 2 Scouts	6	Iéna Forbin Surcouf Chasseloup-Laubat D'Estrées	Du Chayla§ Lalande Descartes	Galilée
Destroyers	12	..	24*	24†	..	6‡	6 ‖	1

* Besides torpedo-flotillas attached to ports. † Besides 6 with nucleus crews. ‡ Besides 18 at various ports. § In Morocco. ‖ Besides 7 at various ports.

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The four British Fleets consist of the same number of battleships as last year, viz., Mediterranean Fleet, six; Atlantic Fleet, six; Home Fleet, six; Channel Fleet, fourteen. The Mediterranean Fleet will be somewhat weakened by the substitution for four Bulwarks of four Canopus class, which are not so well protected. The Atlantic Fleet consists of the same ships as last year. The Channel Fleet is in course of being strengthened by six Bulwark class, in place of two Canopus class, two Majestics, and the Swiftsure and Triumph. As the London, Formidable, Implacable and Venerable, are all down for large repairs, it will probably be late in the year before these changes take effect. The Home Fleet is being strengthened by the substitution of the Agamemnon and Lord Nelson for older vessels, and will be still further strengthened late in the year on the completion of the Bellerophon, Superb and Téméraire, in pursuance of the policy, indicated by the First Lord in his Memorandum of last year, of keeping the Nore Battleship Division of the Fleet up to a strength of six battleships of the latest type. Under the orders of the Commander-in-Chief of the Home Fleet there are in the Portsmouth and Devonport divisions six battleships of the Majestic or Canopus classes, eight first-class cruisers of the Diadem or County classes and the Terrible, five second-class and three third-class cruisers, which are all manned with nucleus crews, besides the eight Royal Sovereigns, two Centurions, the Renown and a number of cruisers which are now described in the Navy List as special service vessels. Ships under repair are no longer to be attached to the Home Fleet. In addition to the twenty-four destroyers in full commission there are three flotillas at Portsmouth, the Nore, and Devonport, of from twenty-four to eighteen destroyers each, with three or four scouts or torpedo gunboats with nucleus crews. The enormous number of destroyers we maintain in commission necessarily means great wear and tear, a large repairs bill and rapid deterioration.

Cruiser Squadrons.

There have been some changes in the ships composing the four Cruiser Squadrons attached to the four Fleets. The Fifth Cruiser Squadron, which is attached to the Home Fleet, will include the last completed armoured cruisers, viz., the Minotaur, Shannon and four Warrior class. The Fourth Squadron (North America and West Indies) comprises the same ships as last year, but the protected cruiser Scylla has been added for duties in the West Indies, and the Sappho has been temporarily attached to the Squadron for duty on both coasts of South America.

Germany.

The German High Sea Fleet is of the same strength as last year, and comprises sixteen battleships. It is probable that the two

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remaining ships of the Deutschland class, the Schlesien and Schleswig-Holstein, will replace two of the Kaiser class before the end of the year. The Reserve Division of the High Sea Fleet consists of one battleship and two coast-defence ships of the Siegfried class. Though it has a superiority in number—sixteen battleships to fourteen—the German High Sea Fleet cannot be considered superior in strength to the British Channel Fleet. The King Edward class are more powerful ships than the Braunschweig or Deutschland classes, while the Wittelsbach and Kaiser classes have only 9·4-in. guns for their principal armament and must be considered inferior to any of the ships in the British Channel Fleet. The Home Fleet, which, as already stated, will ere long consist of four Dreadnoughts and two Agamemnons (without considering the battleships in reserve), gives us a good margin of superiority over Germany in Home waters. The cruiser squadron attached to the German High Sea Fleet consists of four first-class and six small cruisers. The Gneisenau will take the place of the Friedrich Karl as soon as completed.

The Active Squadron of the French Mediterranean Fleet will shortly consist of the six battleships of the Patrie class, four of which are completing or completed, and three armoured cruisers. In the Reserve Squadron there will be the six battleships—Suffren, Bouvet, Masséna, and three Charlemagne class—besides three other battleships *en disponibilité armée*. The French have not for many years had in the Mediterranean a force so greatly superior to the British Mediterranean Fleet. Our relations with France are happily friendly. France.

The Northern Squadron has been reconstituted in three divisions, comprising eight armoured cruisers, while it is proposed to constitute three divisions of three coast-defence ships each in reserve. The Henri IV. and two coast defence ships which were in commission last year are not at the present moment even in partial commission. According to the list of ships in commission given in the *Yacht* of February 28, seven first-class armoured cruisers, including the Léon Gambetta, two second-class armoured cruisers, Desaix and Kléber, and five protected cruisers, are at present included in the Squadron. The Léon Gambetta will probably be transferred to the Mediterranean. Several of the first-class cruisers are under or in urgent need of repair; the effective strength of the Northern Squadron cannot therefore be taken at more than six armoured cruisers. The increase in the number of protected cruisers from two to five is due to the fact that the Naval Division of the Atlantic has been suppressed.

In addition to the destroyers attached to the squadrons there are flotillas of six destroyers each in commission at Cherbourg and Rochefort, besides six destroyers distributed between Brest, Dunkirk,

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and Lorient, and seven destroyers distributed between Toulon, Corsica, Algeria, and Tunis.

Italy. The Italian active Squadron, which is as usual in full commission for only seven months, will this year consist of five battleships, three of the Regina Elena class, and two of the Regina Margherita class; and of four armoured cruisers, three of the Ferrucio type and the Pisa, besides two torpedo gunboats and auxiliary vessels. The Reserve Squadron, which will also be in full commission for seven months, comprises three battleships of the Sicilia class and the two Saint-Bons. The torpedo flotilla, in commission for seven months, includes the Piemonte, as mother ship, seventeen destroyers, and twenty sea-going, four first-class and thirty-six second-class torpedo-boats. Six submersibles will be in commission throughout the year.

Russia. Russia has only two battleships available in the Baltic—the Cesarevitch and Slava; while, if it is true, as stated in the previous chapter, that the Catherine II. and Tchesmé have been condemned, the Black Sea Fleet has been reduced to the six battleships Panteleimon, Tria Sviatitelia, Georgi Pobiedonosetz, Sinope, Rostislav and Dvenadzat Apostoloff, most of which are quite unfit to "lie in a line" against modern battleships. It is possible that before the end of the year the Black Sea Fleet may be strengthened by the completion of the two battleships of the Evstafi type which were launched in 1906.

Austria. The Austrian Active Squadron consists of three battleships of the Erzherzog type, which carry an armament of four 9·4-in. and twelve 7·5-in. guns, with the three smaller battleships of the Babenburg class in reserve.

The following table gives the number of battleships in commission for the British, German and French Navies, for the years 1899, 1903, 1906, 1907 and 1908:—

Year.	GREAT BRITAIN.					GERMANY.		FRANCE.			
	Mediterranean.	Atlantic.	Home.	Channel.	Total.	Battle Fleet.	Reserve.	Northern Squadron.	Mediterranean. Active.	Mediterranean. Reserve.	Total.
1899	11	8	—	10	29	7	—	6	6	9	21
1903	14	6	—	10	30	8	—	5	6	3	14
1906	8	8	13	16	45	15	8†	6	6	3	15
1907	6	6	13*	14	39	16	10†	3‡	6	6	15
1908	6	6	12*	14	38	16	3§	—	6	6	12

* Six in full commission.
† Includes eight coast-defence ships.
‡ Coast-defence ships in reserve.
§ Includes two coast-defence ships.

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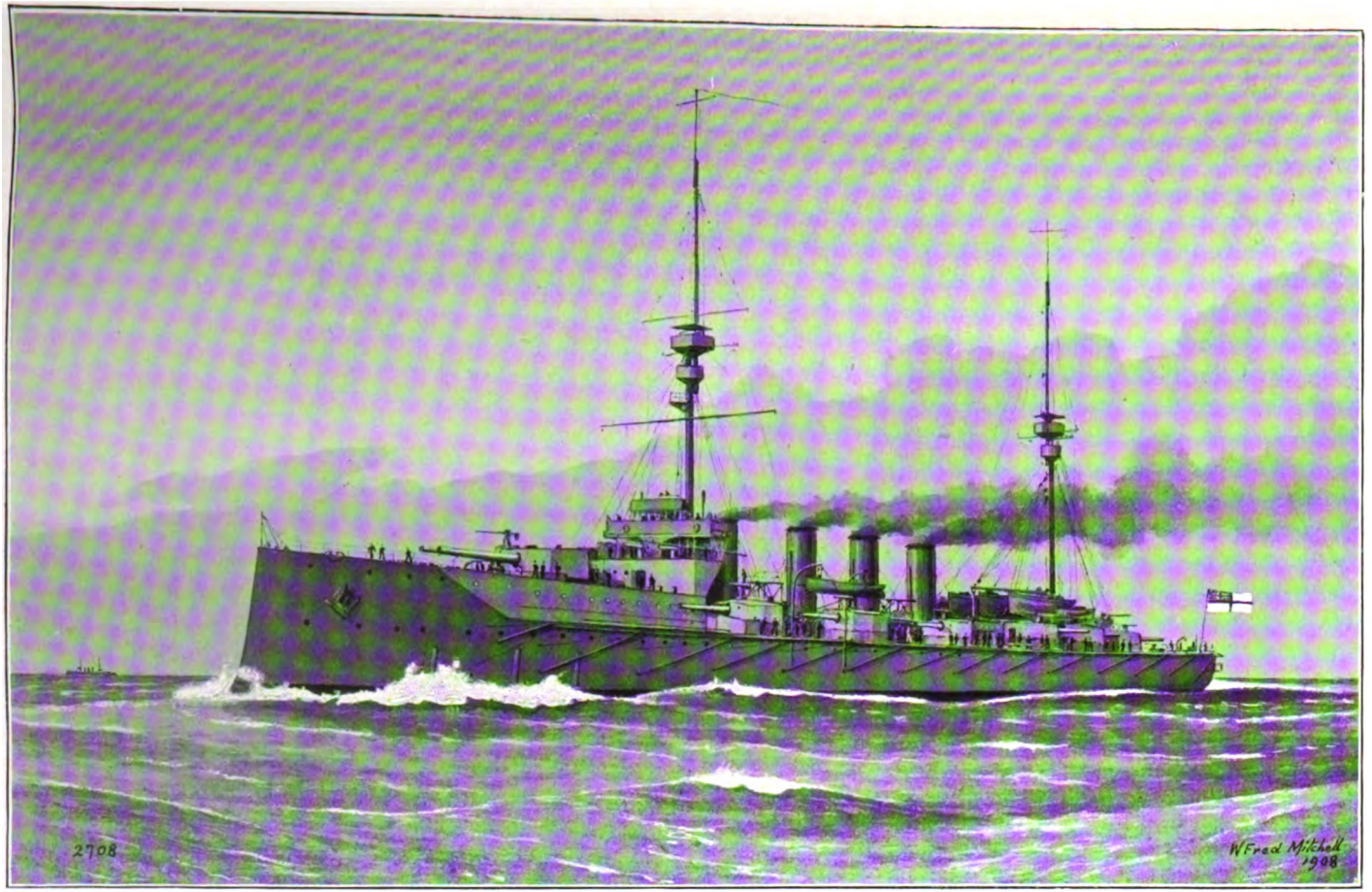

H.M.S. SHANNON.

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The number of British battleships in full commission remains at thirty-two, or twice the number kept in full commission by Germany, and more than the total for France and Germany combined.

United States. The United States now keep in commission a fleet which, including armoured cruisers, is more powerful than that of Germany. The main fleet, consisting of sixteen battleships, a list of which is given in the previous chapter, has been temporarily transferred to the Pacific, where most of the armoured cruisers in commission are also concentrated. There remain on the Atlantic coast, apart from a few protected cruisers, only the battleship Mississippi in commission and the battleships Indiana and Iowa, and the armoured cruiser Brooklyn in reserve.

Extra European waters. The strength of the British Squadrons on the Cape, China, East Indies, and Australian stations remains practically the same as last year. One sloop has been transferred from China to the West Coast of North America.

The following is a list of the Squadrons kept in commission by the principal Naval Powers in Eastern waters:—

	Britain.	*Germany.*	*France.*	*United States.*
CRUISERS (1st Class)	King Alfred. Bedford. Monmouth. Kent. Powerful (A.)	Fürst Bismarck.		West Virginia. Colorado. Maryland. Pennsylvania.
CRUISERS (2nd Class)	Hyacinth (E.I.) Highflyer (E.I.) Challenger (A.) Encounter (A.)		D'Entrecasteaux. Bruix.	
CRUISERS (3rd Class)	Flora. Astraea Cambrian (A.) Perseus (E.I.) Proserpine (E.I.) Pegasus (A.) Pioneer (A.) Prometheus (A.) Pyramus (A.) Psyche (A.)	3. 1 (A.)	Catinat (P.)	4.

A. = Australia. E.I. = East Indies. P. = Pacific.

The French force in Eastern waters has been reduced by the loss of the Chanzy and the withdrawal of the Descartes from Madagascar. It is of interest to note that the Catinat, which represents the French flag in the Pacific, covered in two and half years up to December last 75,000 miles.

Germany has in America one, in the Pacific one, in West Africa one, and in East Africa two small cruisers in commission.

United States Pacific Fleet. The United States Pacific Fleet is organised into three squadrons of two divisions each. The first division of the First Squadron is given above; the second division comprises the armoured cruisers

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California, Tennessee, South Dakota, and Washington. The Second Squadron includes in the first division the first-class cruisers Charleston, Milwaukee, and St. Louis, and in the second division two third-class cruisers. The Third Squadron consists of four third-class cruisers, forming the first division, which is stationed in the Philippines, and six gunboats, stationed for the most part in China, forming the second division. There are in addition two monitors in reserve, and five destroyers in commission in the Philippines. The first two squadrons of the Pacific Fleet have, as stated in the previous chapter, temporarily joined the Atlantic Fleet at San Francisco.

In reviewing the British Squadrons in commission in extra-European waters, we suggested last year that the policy of concentration had been carried too far for the protection of the widespread commercial interests of the British Empire. The criticisms then made have to some extent been met by the commissioning of the two protected cruisers already mentioned, for service in the West Indies and South America. It is to be hoped that a protected cruiser may ere long be substituted for the sloops on the West Coast of South America.

Comparative tables.

Last year we pointed out at some length the difficulties of a reclassification of battleships. These difficulties have been somewhat diminished by the fact that many of the older battleships in British and Foreign Navies have been struck off the list. From the British list there have been removed the Edinburgh, Colossus, Devastation, Thunderer, and the five Admirals, Anson, Benbow, Camperdown, Howe, and Rodney; from the French list the Amiral Baudin, Courbet, Dévastation, Formidable, Magenta, and Terrible; from the Russian list the Tchesmé and Catherine II., and from the Italian list the Lauria and Morosini. Recent British practice has been widely imitated by Foreign Admiralties. After the above ships have been eliminated there would remain in the table of second-class battleships for Great Britain only the Nile and Trafalgar, for the United States six monitors, for Germany nine coast-defence ships, which will shortly be condemned; for France ten ships, of which nine are coast-defence ships and five are twenty years old; for Japan three ships, of which two are small coast-defence ships; for Russia four ships; for Italy five ships, of which one, the Andrea Doria, must shortly, like her sister ships, be condemned. The table of second-class battleships is not worth maintaining on the old lines. A better idea of the relative strength of the various Navies—and this is the object of this section of the *Naval Annual*—is given by transferring a certain number of the older and less powerful battleships, most of which will shortly be struck off the effective strength of the respective

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Navies, to a supplementary list, and by eliminating all coast-defence ships and monitors. The transfer of the Charlemagne and the St. Bon class to the supplementary list may be open to criticism. The Charlemagne class have been transferred because they are deficient in protection; they have no armour on the side above the belt, and only 3-in. armour over their secondary armament. The St. Bons carry a less powerful armament than the Royal Sovereign class.

Dreadnought type.

It has been claimed on behalf of the Dreadnought and her successors that the type outclasses all battleships of earlier design. The all-big-gun armament has been adopted for the battleships now building for the United States and Germany, but it has not been adopted in France or Japan.* It is not certain that an armament composed entirely of heavy guns is superior to an armament which includes a considerable proportion of guns of 10-in. calibre or less. If actions could be always fought at long ranges, of 10,000 yards or thereabouts, the advantage would probably be with the all-big-gun ship, but there are many days in the year when on the seas surrounding our coasts it is impossible to see much less hit a ship at such ranges. The experience of the Battle of Tsushima as well as the recent experiments with the Hero (if the accounts so far published are correct), showed the value of a hail of fire from guns of medium calibre. As in recent discussions on shipbuilding policy, both in Parliament and the Press, comparisons have frequently been confined to ships of the Dreadnought type, the following table is given of the battleships built, building, and projected for the various Naval Powers, which may be considered fit to "lie in a line" with the Dreadnought. It includes the Agamemnons and battleships building in the United States, France, Russia, and Japan which do not carry an all-big-gun armament:—

	Britain.	United States.	Germany.	France.	Japan.	Russia.	Italy.
Built	3	..	..	..	..	..	..
Building	6	4	4	6	4	2	1
Total	9	4	4	6	4	2	1
Projected	1	2	3	..	..	..	1

Battleships.

In the comparative tables the battleships have therefore been arranged as already stated. The present position as regards battleships is shown in the following table:—

	Britain.	United States.	Germany.	France.	Japan.	Russia.	Italy.
Built	54	24	22	18	12	8	10
Building	6	5	6	6	4	4	3
Total	60	29	28	24	16	12	13

Of completed battleships of all classes we have 54 to a total of 46 for Germany and the United States. Of modern battleships we have

* The new battleships (*cf.* Plate 40) carry ten 6-in. guns in addition to twelve 12-in.

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41 as compared with a total of 38 for Germany and the United States. At the present moment we are just over the two-Power standard. But the most significant feature in the above table is the fact that we have only six battleships building, while Germany and France have each the same number, and the United States five ships, under construction. In the British Navy Estimates for 1908–9 it is only proposed to lay down one battleship, while in Germany three will be laid down, and in the United States it is proposed to commence two. The following is a forecast of the probable position at the end of 1908 and three following years as regards more modern battleships :—

	Britain.	United States.	Germany.	France.	Japan.
1908 (end) .	44	21	20	9	11
1909 (to be completed)	Dread-nought 2		Bayern 2		Aki 1
1909 (end) .	46	21	22	9	12
1910 (to be completed)	Dread-nought 2	Michigan 2	Bayern 2	Danton 2	2
1910 (end) .	48	23	24	11	14
1911 (to be completed)	Dread-nought 1	Delaware 2	Bayern 3	Danton 4	2(?)
1911 (end) .	51	25	27	15	16

It is apparent from the above table that after 1910 our relative position will rapidly deteriorate unless more battleships are laid down at no distant date. In 1911, apart from ships not yet projected, only one battleship will be completed for the British Navy as against two for the United States, three for Germany, and four for France. At the end of that year we shall have fifty-one battleships as against fifty-two for Germany and the United States. A considerable addition to our programme of battleship construction is required next year. Battleships laid down after March 31, 1909, could be completed before the end of 1911.

Armoured cruisers.

In armoured cruisers we have an overwhelming superiority, but not greater than is required for the adequate protection of our interests. Of the Invincible type we have three completing and one projected, Germany has two building and one projected, and Japan is reported to have two building. Russia has two smaller armoured cruisers completing, Italy four of about 10,000 tons building or completing. Neither the United States nor any European Power, except Germany, has any armoured cruisers projected. The value of the larger armoured cruiser is discussed in a subsequent chapter.

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Vessels of the Invincible type, as we said last year, appear too large and too costly for most of the duties of a cruiser, while in the line of battle their comparatively light protection would be a disadvantage, and their high speed of little value. They would on the whole be better classified in the battleship than in the cruiser tables.*

Protected cruisers.

In protected cruisers of the second or third classes we have still a large superiority, but that superiority has been greatly lessened since last year by the fact that fourteen third-class cruisers, included in the comparative tables last year, have been struck out. Other cruisers, such as the St. George, Bonaventure and Thetis, have been, or are being, converted into depôt-ships for submarines or destroyers, or into mine-laying vessels, still further reducing the number of cruisers available for the protection of commerce. The modern third-class cruisers of the Boadicea or German types could run away from, but could not fight, the cruisers which are now being removed from the list. It is to be hoped that the new type of cruiser which is to be laid down in the coming year for the British Navy will possess greater fighting qualities.

T. A. Brassey.

* The First Lord's description of the Inflexibles as cruiser battleships came too late to enable the comparative tables to be recast this year. The following are the numbers of the type under construction or projected :—

	Britain.	Germany.	Japan.
Building . . .	3	1	—
Projected . . .	1	1	2

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Comparative Tables of British, German, United States, French, Japanese, Russian, and Italian Ships.

TABLE I.—BATTLESHIPS.

GREAT BRITAIN.			UNITED STATES.			GERMANY.			FRANCE.			JAPAN.			RUSSIA.			ITALY.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.			tons.			tons.			tons.			tons.
	Collingwood ...	19,250		*Delaware*	20,000		*Ersatz Baden* ...	18,307		*Danton*	17,710		*A.*	20,800◊	1907	*Imperator Pavel* ...	17,200		*A*	18,000
	St. Vincent ...			*North Dakota* ...			*Ersatz Württemburg* ...			*Condorcet* ...			*B.*			*...				
	Vanguard ...			*Michigan*						*Diderot*		1907	*Aki*	19,800	1906	*Andrei Pervozvannyi* ...				
1907	*Bellerophon* ...			*South Carolina* ...	16,000	1908	*Nassau*	17,679		*Mirabeau*		1906	*Satsuma*	19,350						
1907	*Téméraire* ...	18,600					*Ersatz Sachsen* ...			*Vergniaud* ...										
1907	*Superb*									*Voltaire*										
1906	Dreadnought ..	17,900																		
1906	Lord Nelson ...	16,500																		
1906	Agamemnon ...																			
1903	Edward VII. ...		1905	*Idaho*	13,000	1904	Deutschland ...		1903	Patrie		1905	Kashima	16,400	1906	*Ioann Zlatoust* ...	12,733	1904	Regina Elena ...	
1903	Commonwealth		1905	Mississippi ...		1905	Hannover ...		1902	République ...		1905	Katori	15,950		*Evstafi*		1904	Emanuele III. .	12,425
1903	Dominion ...		1904	Connecticut ...		1905	Pommern		1905	Liberté		1902	Iwami	13,516	1903	Slava	13,516	1907	*Roma*	
1903	Hindustan ...	16,350	1905	Kansas		1906	*Schlesien*	13,200	1904	Justice	14,635	1900	Hizen	12,700	1901	Cesarevitch ...	12,912	1905	*Napoli*	
1904	New Zealand ...		1904	Louisiana ...		1906	*Schleswig-Holstein*		1907	Vérité		1899	Asahi	15,200	1900	Panteleimon ...	12,480	1901	Ra Margherita	13,214
1905	Africa		1906	Minnesota ...	16,000				1904	Démocratie ...		1900	Mikasa	15,200				1901	Benedetto Brin	
1904	Britannia		1906	New Hampshire		1902	Braunschweig ...		1899	Suffren	12,527	1898	Shikishima ...	14,850						
1905	Hibernia		1905	Vermont		1903	Elsass		1896	Bouvet	12,007	1898	Sagami	12,674						
1903	Swiftsure	11,800	1904	Georgia		1903	Hessen	12,997	1895	Masséna	11,735	1900	Suo							
1903	Triumph		1904	Nebraska ...		1903	Preussen					1896	Fuji	12,320						
1902	Queen	15,000	1904	New Jersey ...	14,948	1904	Lothringen ...													
1902	Prince of Wales		1904	Rhode Island ...		1900	Wittelsbach ...													
1901	Albemarle ...		1904	Virginia		1901	Wettin													
1901	Cornwallis ...		1901	Ohio	12,440	1901	Zähringen ...	11,643												
1901	Duncan	14,000	1901	Maine	12,300	1901	Mecklenburg ...													
1901	Exmouth		1901	Missouri		1901	Schwaben													
1901	Russell		1898	Wisconsin ...	11,653	1896	Kaiser Friedrich III.													
1898	Formidable ...		1898	Alabama	11,565	1897	Kaiser Wilhelm II													
1896	Irresistible ...		1898	Illinois																
1899	Implacable ...		1898	Kearsarge ...	11,540	1899	Kaiser Wilhelm der Grosse ...	10,974												
1899	London	15,000	1898	Kentucky																
1899	Venerable ...					1900	Kaiser Barbarossa													
1899	Bulwark																			
1897	Canopus					1899	Kaiser Karl der Grosse													
1899	Glory																			
1898	Albion	12,950																		
1898	Goliath																			
1898	Ocean																			
1899	Vengeance ...																			
1894	Magnificent ...																			
1895	Majestic																			
1896	Prince George ...																			
1895	Victorious ...																			
1896	Cæsar	14,900																		
1896	Hannibal																			
1896	Illustrious ...																			
1895	Jupiter																			
1896	Mars																			
	47 ships.*	720,650		25 ships.†	363,643		24 ships.‡	316,212		15 ships.	230,339		14 ships.	222,134		7 ships.	97,634		7 ships.‖	94,128

* One projected. † Two projected. ‡ Three projected. ◊ Doubtful. ‖ One projected.

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TABLE II.—OLDER BATTLESHIPS.

GREAT BRITAIN.			UNITED STATES.			GERMANY.			FRANCE.			JAPAN.			RUSSIA.			ITALY.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.			tons.			tons.			tons.			tons.
1895	Renown	12,350	1896	Iowa	11,340	1891	Brandenburg ...	9,874	1896	St. Louis	11,090	1894	Tango	10,960	1893	Tria Sviatitelia	13,318	1897	E. Filiberto ...	9,645
1891	Royal Sovereign	14,150	1893	Indiana	10,288	1891	Kurfürst Friedrich Wilhelm		1896	Gaulois	11,105	1889	Iki	9,672	1892	Georgi Pobiedonosetz	10,280	1897	Saint Bon... ...	
1891	E. of India ...		1893	Massachusetts...					1895	Charlemagne ...	11,108							1885	Andrea Doria ...	11,027
1891	Hood...		1893	Oregon		1891	Weissenburg ...		1893	Jauréguiberry...	11,637				1887	Sinope	10,180	1888	Re Umberto ...	13,673
1892	Ramillies... ...					1892	Wörth		1893	Charles Martel	11,693				1896	Rostislav	8,880	1890	Sardegna	13,640
1892	Repulse								1894	Carnot	11,954				1890	Dvenadzat Apostoloff ...	8,433	1891	Sicilia	13,087
1892	Resolution ...								1891	Brennus	11,190									
1892	Revenge								1886	Hoche	10,581									
1892	Royal Oak ...								1899	Henri IV. ...	8,807									
1893	Barfleur	10,500																		
1892	Centurion... ...																			
1888	Nile	11,940																		
1887	Trafalgar... ...																			
	13 ships.	170,430		4 ships.	42,204		4 ships.	39,496		9 ships.	99,165		2 ships.	20,632		5 ships.	51,091		6 ships.	70,717

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TABLE III.—FIRST-CLASS CRUISERS.

GREAT BRITAIN.			UNITED STATES.			GERMANY.			FRANCE.			JAPAN.			RUSSIA.			ITALY.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
25	*Invincible* ...	17,250	22	Washington ...	14,500	25	*F‡*	17,000	23	*Edgard Quinet*	13,780	21	Ikoma	13,750	21	Rurik	15,000	22½	*Amalfi*	9,832
25	*Inflexible*		22	Tennessee ...		22½	*E‡*	14,760	23	*Waldeck-Rousseau* ...		21	Tsukuba		22	Adm. Makaroff	7,900	22½	*Pisa*	
26	*Indomitable* ...		22	*Montana*		22½	Scharnhorst ...	11,420	23	*Ernest Renan* ...	13,427	22	*Ibuki*	14,620	21	*Bayan*		22½	*San Giorgio* ...	
22½	Minotaur	14,600	22	North Carolina	9,700	22½	*Gneisenau* ...		23	*Jules Michelet* ..	12,370	22	*Kurama*		21	*Pallada*		21	*San Marco* ...	
22½	Shannon		22	St. Louis		21	Roon	9,350	22	Léon Gambetta	12,351	21	Aso	7,726	20	Gromobol	12,336	20	Giuseppe Garibaldi	7,294
22½	*Defence*		22	Charleston ..		21	Yorck		20½	Prinz Adalbert	8,858	20	Kasuga	7,700	20	Rossia	12,130	20	Varese	
22	Duke of Edinburgh	13,550	22	Milwaukee ...	13,680	20½	Friedrich Karl ...		22	Jules Ferry ...		20	Niishin					20	F. Ferruccio ...	
22	Black Prince ...		22	West Virginia		20½	Prinz Heinrich	8,759	22	Victor Hugo ...		21	Idzumo	9,750						
22	Achilles		22	California ...		19	Fürst Bismarck	10,570	21	Condé	9,856	21	Iwate							
22	Cochrane		22	Colorado					21	Gloire		20	Yakumo	9,850						
22	Natal		22	Maryland					21	Marseillaise ...		21	Adzuma	9,436						
22	Warrior		22	Pennsylvania ...					21	Amiral Aube ...		21‡	Asama	9,700						
22½	Devonshire ...	10,850	22	South Dakota ...					21	Gueydon		21‡	Tokiwa							
22½	Antrim		21	New York ...	8,200				21	Montcalm ..	9,367									
22½	Argyll		21	Brooklyn	9,215				21	Dupetit Thouars										
22½	Carnarvon ...								21	Jeanne d'Arc ...	11,092									
22½	Hampshire ...																			
22½	Roxburgh ...																			
23	Monmouth ...	9,800																		
23	Kent																			
23	Bedford																			
23	Essex																			
23	Berwick																			
23	Cornwall																			
23	Cumberland ...																			
23	Donegal																			
23	Lancaster ...																			
23	Suffolk																			
23	Drake	14,100																		
23	Good Hope ...																			
23	King Alfred ...																			
23	Leviathan ...																			
21	Aboukir	12,000																		
21	Bacchante ...																			
21	Cressy																			
21	Euryalus																			
21	Hogue																			
21	Sutlej																			
20‡	Amphitrite ...	11,000																		
20‡	Argonaut																			
20‡	Ariadne																			
20‡	Spartiate																			
20‡	Andromeda ...	11,000																		
20‡	Diadem																			
20‡	Europa																			
20‡	Niobe																			
22	Powerful	14,200																		
22	Terrible																			
	48 ships.*	584,750		15 ships.	186,595		10 ships.†	110,345		15 ships.	169,027		13 ships.◊	136,212		6 ships.	63,166		7 ships.	61,210

* 1 projected. † 6 projected. ‡ The particulars of these ships are doubtful. ◊ Two projected.

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TABLE IV.—SECOND-CLASS CRUISERS.

GREAT BRITAIN.			UNITED STATES.			GERMANY.			FRANCE.			JAPAN.			RUSSIA.			ITALY.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
19½	Crescent	7,700	22·8	Columbia	7,375	21	Kaiserin Augusta	5,956	21	Desaix	7,578	22	Chitose	4,760	18	Pamyat Azova	6,734	20	Carlo Alberto ...	6,396
20	Edgar	7,350	23	Minneapolis ...					21	Dupleix		22	Kasagi	5,416	20	Aurora	6,731	20	Vettor Pisani ...	
20	Endymion ...	7,350	21½	Olympia	5,870	19½	Freya	5,569	21	Kléber		23	Soya	6,500	20	Diana	6,630	19	Marco Polo ...	4,511
19½	Gibraltar	7,700				19½	Hertha		20	Dupuy de Lôme	6,676	20	Tsugaru	6,630	23	Askold	5,905			
20	Grafton	7,350				19½	Victoria Luise		19	D'Entrecasteaux	7,995				23	Bogatyr	6,645			
20	Hawke	7,350				19½	Hansa	5,791	23	Guichen	8,151				23	Kagul				
19½	Royal Arthur ...	7,700				19½	Vineta		23	Châteaurenault	7,898				23	Otchakoff				
20	Theseus	7,350							18	Bruix	4,735				23	Oleg	6,675			
19½	Diana	5,600							18	Charner	4,702									
19½	Dido								18	Latouche-Tréville	4,681									
19½	Doris								19	Pothuau	5,374									
19½	Eclipse								23	Jurien de la Gravière ...	5,595									
19½	Isis																			
19½	Juno																			
19½	Minerva																			
19½	Talbot																			
19½	Venus																			
19	Arrogant ...	5,750																		
19	Furious																			
19	Gladiator																			
19	Vindictive ...																			
20	Hermes	5,600																		
20	Highflyer																			
20	Hyacinth																			
21	Challenger ...	5,880																		
21	Encounter ...																			
	26 ships.*	161,810		3 ships.	20 620		6 ships.	34,245		12 ships.	78,541		4 ships.	23,306		8 ships.	52,610		3 ships.	17,303

* St. George, to be converted into depôt ship, omitted.

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TABLE V.—THIRD-CLASS CRUISERS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
25	*Boadicea*	3,300
23	Amethyst	3,000
22	Diamond	
22	Sapphire	
22	Topaze	
19½	Astræa	4,360
19½	Cambrian	
19½	Charybdis	
19½	Flora	
19½	Forte	
19½	Fox	
19½	Hermione	
19½	Æolus	3,600
19½	Brilliant	
19½	Indefatigable ...	
19½	Iphigenia	
20	Latona	3,400
20	Sappho	
20	Scylla	
19½	Sirius	3,600
20	Terpsichore ...	3,400
19	Thalomel	2,575
20½	Pelorus	2,135
20	Proserpine ...	
20	Pegasus	
20	Perseus	
20	Prometheus ...	
20	Pyramus	
20	Pandora	2,200
20	Pioneer	
20	Psyche	
	31 ships.*	99,405

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
18½	Detroit	2,089
18½	Marblehead ...	
18½	Montgomery ...	
20	Albany	3,487
20	New Orleans ...	
20	Baltimore	4,413
18	Chicago	5,273
19	Newark	4,098
19½	San Francisco ...	
19	Cincinnati ...	3,213
19	Raleigh	
24	*Birmingham* ...	3,750
24	*Chester*	
24	*Salem*	
	14 ships.†	45,049

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
20	Gefion	3,712
20	Irene	4,233
19	Prinzess Wilhelm ...	
21	Gazelle	2 603
21	Niobe	
21	Medusa	2,618
21	Nymphe	
21	Amazone	
21	Ariadne	
21½	Thetis	
21½	Frauenlob ...	2,657
21½	Arcona	
21½	Undine	
23	Bremen	3,200
23	Hamburg ...	
23	Berlin	
23	Munchen	
23	Lubeck	
23	Leipzig	
23	Danzig	
23	Königsberg ...	3,316
23½	Stuttgart ...	3,396
23½	Nürnberg	
23½	Stettin	
24½	*Ersatz Pfeil* ...	3,544
24½	*Dresden*	
25	*Ersatz Greif* ...	3,740
25	*Ersatz Jagd* ...	
	28 ships.‡	88,947

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
20	Davout	3,031
20	Linois	2,308
20	Galilée	2,318
20	Lavoisier	2,285
20½	D'Estrées	2,421
20½	Infernet	2,435
19	Alger	4,313
19	Isly	4,406
19½	Chasseloup-Laubat ...	3,824
19½	Friant	3,882
19½	Pascal	3,951
19	Descartes	3,970
19	Cassard	3,890
19	D'Assas	3,962
19	Du Chayla ...	3 890
19	Catinat	4,018
19	Protet	4,001
20½	Cosmao	1,923
20½	Forbin	1,935
20½	Lalande	1,968
20½	Surcouf	2,012
	21 ships.	66,773

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
20	Akashi	2,657
20	Suma	
19	Akitsushima ...	3,150
17	Chiyoda	2,450
17	Hashidate ...	4,277
17	Itsukushima ...	
17	Matsushima ...	
18½	Naniwa	3,700
18½	Takachiho ...	
20	Niitaka	3,365
20	Tsushima	
20	Otawa	3,000
25	Sutsuya ... ... (ex Novik)	3,980
23	*Tone*	4,035
23	*X*	
	15 ships.	52,025

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
19	Almaz	3,285
23	Jemtchug ...	3,106
	2 ships.	6,391

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
17	Vesuvio	3,373
18	Etna	3,470
17½	Ficramosca ...	3,534
17	Stromboli	3,836
21	Piemonte	2,597
17	Calabria	2,428
18	Elba	2,690
17½	Giovanni Bausan	3,277
19	Etruria	2,245
18	Liguria	
18	Umbria	
17	Lombardia ...	2,351
20	Puglia	2,498
	13 ships	36,789

* 6 projected. 14 cruisers included last year under Head B, Bonaventure and Thetis, converted into ships for subsidiary purposes, omitted.

† 4 Chester type proposed.

‡ 2 projected.

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Effective Fighting Ships, Built and Building.

Class.	Great Britain.			United States.			Germany.			France.			Japan.			Russia.			Italy.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships:—																					
Modern ...	41	6	47	20	5	25	18	6	24	9	6	15	10	4	14	3	4	7	4	3	7
Older... ...	13	—	13	4	—	4	4	—	4	9	—	9	2	—	2	5	—	5	6	—	6
Total ...	54	6	60	24	5	29	22	6	28	18	6	24	12	4	16	8	4	12	10	3	13
Cruisers:—																					
1st Class ...	44	4	48	14	1	15	7	3	10	11	4	15	11	2	13	4	2	6	3	4	7
2nd Class ...	26	—	26	3	—	3	6	—	6	12	—	12	4	—	4	8	—	8	3	—	3
3rd Class ...	30	1	31	11	3	14	24	4	28	21	—	21	13	2	15	2	—	2	13	—	13
Total ...	100	5	105	28	4	32	37	7	44	44	4	48	28	4	32	14	2	16	19	4	23

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CHAPTER IV.

Foreign Naval Manœuvres.

Object of the French operations.

The French Manœuvres of 1907, in which the Mediterranean and Northern Squadrons took part, were in reality a series of exercises. They were under the direction of Vice-Admiral Touchard, since appointed French Ambassador at St. Petersburg, and were upon a large scale. Of the mobilisation there is little to say, the reservemen not being called out, because the elections for the Conseils Géneraux were taking place at the same time. The Third Division of the Mediterranean Squadron was brought up to full complements, but the Fourth (Reserve) Division was engaged only in the special tactical exercises at the conclusion. There were scouting exercises, torpedo attacks, and other operations, but the dominant interest was in the further, and it is probable, the final trials of the new system of tactics associated with the name of Admiral Fournier, and the light thrown upon the condition of the armaments and ammunition of French warships. In regard to the first of these matters, a general impression prevailed that too much time had already been expended in the study of these tactical plans and the exhaustive preparation for the execution of them, and the very fact that after three years of effort the value of the system had not been demonstrated was held by many to prove its impracticable character.

Constitution of the squadrons.

The Mediterranean Squadron left its rendezvous at Mers-el-Kébir at 10 p.m. on 2nd of July, and on the following day the Northern Squadron, Vice-Admiral Jauréguiberry, departed from Brest. Passing Gibraltar early on the morning of the 4th, Admiral Touchard, whose flag had been joined by the Patrie, Desaix, and Du Chayla, divided his force in order to constitute two groups or squadrons as follows:—

Squadron A:—Suffren (flag of Vice-Admiral Touchard), Charlemagne, République, Masséna (flag of Rear-Admiral Kiésel), Carnot, Jauréguiberry. Light division:—Jules Ferry (flag of Rear-Admiral Krantz), Victor Hugo, Condé, Gueydon, Dupetit-Thouars, and six destroyers of the Mediterranean Squadron.

Squadron C:—St. Louis (flag of Rear-Admiral Manceron), Gaulois, Patrie, and the Cruisers Desaix, Du Chayla, Galilée and La Hire.

The Northern Squadron constituted the third group in the tactical scheme:—

Squadron B:—Léon Gambetta (flag of Vice-Admiral Jauréguiberry), Amiral Aube Gloire (flag of Rear-Admiral Philibert), Jeanne d'Arc, Forbin, Cassini, and five destroyers of the Northern Squadron.

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The first exercise.

The object of "A" was to intervene between "B" and "C," whose commanding officers had previously concerted their plans, and to bring one of them to action, being stronger than either, but inferior to the two combined. "A" was limited to a speed of 12 knots, "B" of 15 knots, "C" of 10 knots, and the cruisers of 15 knots. The area of operations was bounded on the West by the 15th meridian of longitude and on the North and South by parallels 43 and 35 N. lat. At the opening of hostilities "A" was on the parallel of Cape St. Vincent, 200 miles to the westward, "B" on that of Cape Finisterre, and "C" on that of Mazagan, 60 miles from that place.

The scheme. Its limitations.

This scheme had much in common with many exercises tried in our own and foreign manœuvres. The limitation of speed introduced an element of unreality, and deprived the operations of the desirable quality of representing an image of the occurrences of war, making them an exercise capable of being worked out upon a chart. Reasons of economy have sometimes entered into such dispositions, but economy of this kind may be counted unwise. Speed is an element of success which is capable of being employed only in actual operations, and if Admirals are restricted in their use of it, strategically or tactically, a right understanding of its value, and the certitude of the means of its exercise will be lost from the lessons of manœuvres. The use of high speed, or of maximum speed, involves risks, the proper appreciation of which is of signal importance, and Nelson said in the Mediterranean in 1805, "The great evil of our Navy is that the men who command it are unused to all the risks of command."

In this particular exercise of the French manœuvres, which began at 7 a.m. on July 5th, the "A" squadron was too weak in cruisers to establish observation over the whole section of the area of operations through which "B" or "C" must pass. Moreover, being inferior in speed by three knots to the "B" squadron, Admiral Touchard was in no position to deal with that force, and the only procedure therefore open to him was to endeavour to bring the slower and inferior "C" squadron (Rear-Admiral Manceron) to action. It was supposed that the latter, whose interest it was to join Admiral Jauréguiberry as soon as possible, would proceed northward at his maximum allowed speed of 10 knots, with the object of effecting a concentration somewhere in the neighbourhood of the meridian of 13° west longitude, avoiding the dangerous region in which the coasts of Spain and Morocco converge towards the Gut of Gibraltar, where the duties of the opposing cruisers would be simplified.

The execution of the scheme.

Admiral Touchard, with his five cruisers, decided to establish his screen of observation in the western part of the area of operations, sacrificing everything to the east of the 11th meridian. The cruisers

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were, therefore, spread out upon a parallel about 160 miles north of Mazagan, and it was expected that "C" would be discovered on his way to the north. Nothing, however, was seen of Admiral Manceron, and therefore the "A" cruisers were directed to explore a second zone, a little to the south of Cape St. Vincent. This was on the morning of July 6th, but the search was again fruitless, and the cruisers returned to the rendezvous in the evening. Meanwhile the Dupetit-Thouars, one of Admiral Touchard's cruisers, had taken in a wireless signal which informed him that squadrons "B" and "C" had effected their junction to the south of Cape St. Vincent, and to the east of the region in which the "A" cruisers had made their search. Admiral Jauréguiberry had adopted a bold course, relying on his superior speed, and based on a balance of probabilities. He had instructed his Rear-Admiral to proceed north-eastward along the coast of Morocco to a rendezvous about 50 miles from Cape Spartel, to which it was his intention to proceed direct after doubling Cape St. Vincent. In pursuance of these orders the Rear-Admiral kept along the coast until he arrived abreast of Larache, there stopped engines for about six hours, and then proceeded to the appointed rendezvous, where Admiral Jauréguiberry met him as arranged at 5 p.m. on 6th July. The operation was thus successfully concluded, and the whole Fleet then assembled under command of Admiral Touchard.

Comments.

The reflections to be made upon this first period of the manœuvres are few. There was a deficiency of speed in the squadron of Admiral Touchard whereby the strategical choice was limited. There was also the want of cruisers, which in numbers were inadequate for his purpose. Want of speed and want of cruisers were the main factors in his want of success. To this was also added failure to penetrate the intentions of his adversaries, in relation to which the Vice-Admiral might remember the profound truth of a naval judgment offered in matters not altogether dissimilar, that the world attaches wisdom "to him who guesses right." Nelson himself did not guess right when Villeneuve escaped from Toulon in 1805. A somewhat similar difficulty to that presented to Vice-Admiral Touchard was presented, in larger operations, to Sir Compton Domvile, commanding the "X" Fleet in the British manœuvres of 1903, owing to the fact that his adversary was to join his detached squadron of cruisers "in the approaches to the Channel," and that therefore the rendezvous of the two "B" squadrons, commanded by Sir Arthur Wilson and Lord Charles Beresford, might not have been so far to the westward as proved to be the case.

After this exercise the three French squadrons, united under the

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command of the Vice-Admiral, entered the Mediterranean on the morning of 8th July, and on that day and the next were employed in operations and exercises described as of *assouplissement*, in view of the approaching trial of the Fournier tactics. At night there was to have been a torpedo attack, but a brisk breeze sprang up from the north-east, and none of the boats were seen. The ships then proceeded to their rendezvous at Algiers, Bona, Philippeville, and Biserta, and at the latter place interesting torpedo operations took place, in which the destroyers scored some successes.

The second period of the manœuvres was devoted to an exercise of search and contact, in which two squadrons were engaged. The "A" Squadron, comprising the first two Divisions of the Mediterranean with six destroyers and some cruisers, under Admiral Touchard, was assigned a speed of 10 knots, while Vice-Admiral Jauréguiberry, with the "B" Squadron (being the Third Division and all the armoured cruisers), had a speed of 11 knots for his battleships and 15 knots for the light division. The Léon Gambetta, Amiral Aube, and Dupetit-Thouars were regarded as a Division of battleships. Instead of the exercise taking place in the extreme west of the Mediterranean an imaginary zone was created, in which Gibraltar was placed near Algiers and the parallels of latitude were directed to the north-east. This curious arrangement was a matter of convenience for the concentration and distribution of the squadrons, but it presented some disadvantages. The second period.

It was the object of Vice-Admiral Jauréguiberry to discover his adversary as the "A" Squadron advanced into the Mediterranean. The hour of the departure of the latter from the fictitious Gibraltar, and the speed being both known, the problem presented was of simple character. As a matter of fact, at 5 o'clock on the morning of the 16th the Gueydon and some other cruisers had scarcely arrived at the north-eastern limit of the zone to be observed when they discovered the "A" Squadron steaming in line ahead to the north. Intelligence was transmitted to the "B" Battle Squadron, and the opposing forces were soon within view, whereupon Admiral Touchard declared the operation at an end. The theme.

The afternoon of the 16th was devoted to steam tactics upon Admiral Fournier's system, and on the same night there was an attack by the Corsican torpedo flotilla, the Epée scoring a success against the Suffren. Scouting exercises followed and more steam tactics, and on July 17th, at 7 p.m., the combined squadrons anchored at the Salins d'Hyères. Further evolutions were resumed on the next day, and at night the Fleet anchored in the roadstead of La Badine, where an attack was made by the first torpedo flotilla. A Exercises at the Salins d'Hyères and La Badine.

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partial boom defence had been formed covering 1800 mètres, and the cruisers patrolled; but some of the destroyers penetrated the screen, and the Masséna and Jauréguiberry were torpedoed. It is, however, extremely doubtful whether any squadron would venture to lie at night in war time in an open roadstead like that of La Badine. The exercises and operations were continued until July 20th, when the combined squadrons reached Toulon to coal and take in supplies.

The third period. The tactical exercises.

The third period of the manœuvres was devoted to an exhaustive trial of Admiral Fournier's tactics, for which the Fleet had been prepared by a training covering three years, and the manœuvres of 1905, 1906, and 1907. On this occasion the Special Tactical Committee, under the Presidency of Vice-Admiral Caillard (*Commission de refonte de la tactique navale*), was present to direct and observe the operations. The trials were thus made in the most favourable circumstances, with ample force and with goodwill on the part of all concerned, who were wishful to put an end to the long period of doubt which had so greatly affected the development of French naval tactics. For these operations the Reserve Division of the Mediterranean Squadron was added to the Fleet, which was then composed as follows:—

First Squadron (Vice-Admiral Touchard):—Suffren, Charlemagne, République, St. Louis, Gaulois, Patrie.
Second Squadron (Vice-Admiral Jauréguiberry):—Léon Gambetta, Amiral Aube, Dupetit-Thouars, Masséna, Jauréguiberry, Carnot.
Third Squadron (Rear-Admiral Germinet):—Brennus, Hoche, Charles Martel, Gloire, Gueydon, Jeanne d'Arc.
Light Division (Rear-Admiral Krantz):—Jules Ferry, Victor Hugo, Condé.
Division representing the enemy (Captain Moreau):—Desaix, Du Chayla, La Hire, Cassini, and six destroyers.

Principles of Admiral Fournier's tactics.

Here it may be remarked that the essential principle of the Fournier tactics is the constitution of a Fleet in divisions or *pelotons* of three ships, each division grouped in a triangular formation, and that the object is to enable such a Fleet to manœuvre in the presence of an enemy, without signalling, or with a minimum of signalling, and without the use of the compass on the bridge. The leader of each division follows the movements of the Commander-in-chief, and the captains, without preserving a rigid order in the divisions, take the position the most suitable in the group or *peloton* to which they belong for the employment and concentration of fire. Thus each division presents an irregular and variable triangle, and the Fleet is composed of a number of such triangular *pelotons*, basing their movements upon those of the Admiral. A writer in the *Yacht*, describing the tactics, pointed out that Admiral Fournier appeared to have desired in the beginning to leave a certain degree of autonomy or initiative to the officers commanding divisions. Thus,

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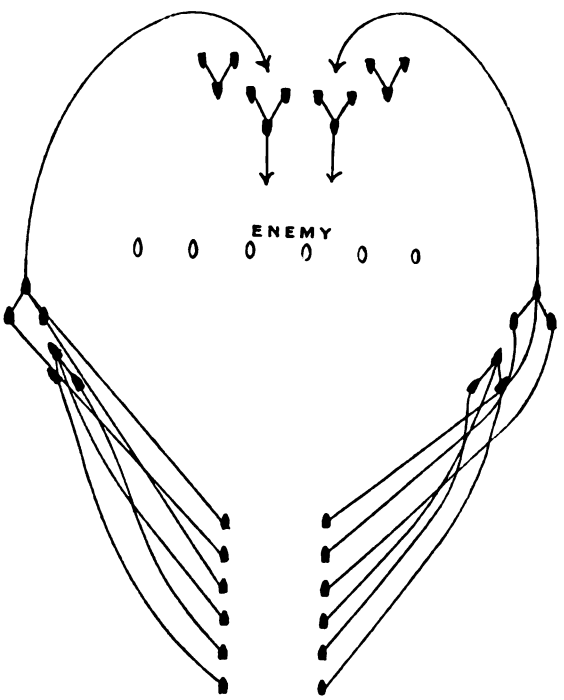
the triangular *pelotons* were to be able to operate independently according to a plan previously arranged. Subsequently, however, the ideas of the former "admiralissimo" took another direction. He saw in his method the means of giving to the Commander-in-chief the absolute direction of the whole Fleet. There was to be no more autonomy, but only the orders of the Admiral, or at least his directing thought, for the very principle of the new tactics was that no instructions or particular indications would be required. Admiral Fournier had summarised the advantages of his tactics under the

Fig. 1.



formula, "Neither signals nor compass." *On ne pouvait rêver plus merveilleux automatisme.* The principle is to employ what are known as *colonnes de croisement*, with the object of concentrating superior fire upon one or both ends of the enemy's line, whether his ships be disposed abreast or in line ahead. The advantages claimed are (1) that the formation would be shorter than the single line; (2) that the Fleet so formed would be easily manœuvred; (3) that the ships could be handled in the desired formation if the signal halyards and bridge were shot away; (4) that it would be impossible for an enemy to concentrate fire on one or a few of the ships; and (5) that

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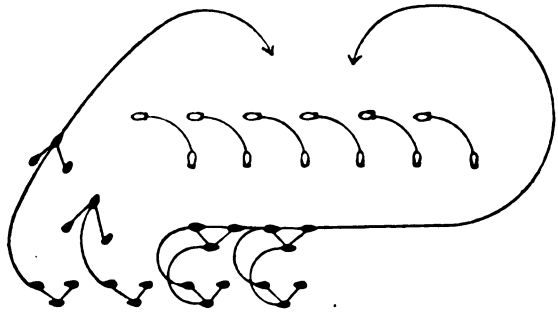
the formation would permit the best use of the ships' guns. The diagrams will give an idea of the system employed. It will be seen how the divisions are formed from the single line, how the *colonnes de croisement* may be employed to concentrate on particular parts of the enemy's line, how they may be handled to meet changes of

Fig. 2.

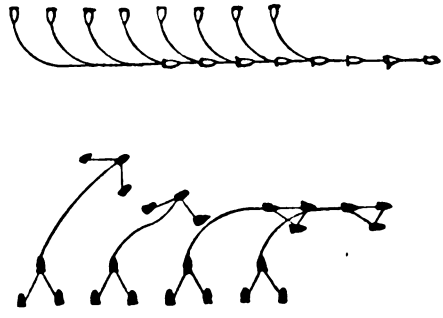


formation and direction on the part of the enemy, and generally how they are designed to be employed to concentrate superior force against inferior.*

The four days' tactics.

Something may now be said of the operations which were planned for the elucidation of these tactics, though there is no purpose of describing them in much detail. On the first day (July 23rd) the line

Fig. 3.



of battle was formed in the triangular groups or divisions as described, and the divisions manœuvred with few signals, but using the bridge compass. In the first exercise the groups were in line abreast of one another. Then by certain movements they took position in quarter

* An excellent account of the Fournier tactics will be found in the *Rivista Marittima*, November, 1907. They have also been described and criticised adversely in the *Marine Rundschau*, November, 1907.

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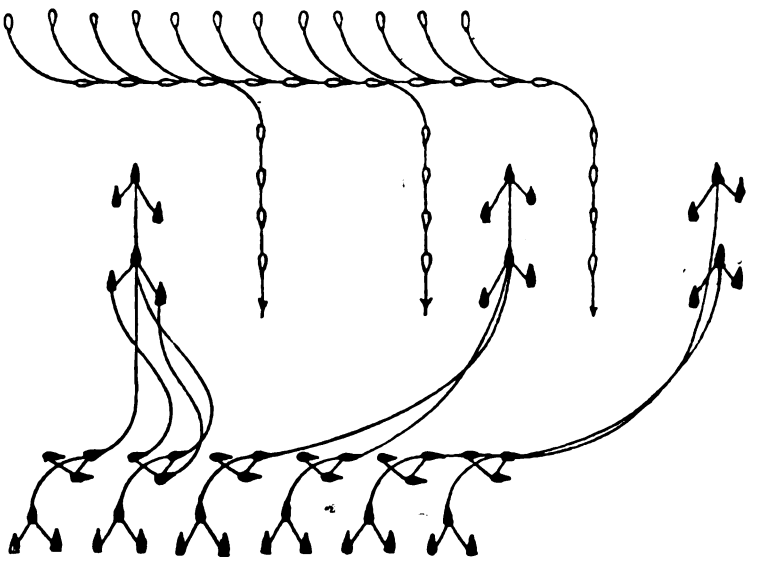
line. There was a little confusion in the rather complicated change of formation, but on the whole it was creditably executed. Other formations of the triangular groups followed, conforming to the pre-arranged movements of the Admiral, and the whole day was well occupied. On the next day the exercises were continued, signalling being still employed. The first exercise was one in which the groups were ordered to take position in quarter line, but the operation was slow, and was not completed until about half an hour after the order had been given. Throughout the day there were other like exercises, but description is unnecessary, except to say that delay occurred, and that the captains showed some anxiety and hesitation. On the third

Fig. 4.



day the use of the compass—that is of the compass on the bridge—was discontinued, and there was a sparing use of signals. Moreover, the situation was complicated by the supposition of fog and surprise. The Fleet was formed in groups disposed abreast, and then, to meet a flank movement of the enemy, represented by the division of Captain Moreau, changed to quarter line, or rather changed the direction of the line, to face the enemy. A correspondent of the *Moniteur de la Flotte*—to which excellent journal I am much indebted for this account of the tactical operations—remarked of this exercise that the officers of Captain Moreau's division were in a position to see what splendid targets were presented by the ships of the Fleet during the considerable period which was required to bring it into the desired formation.

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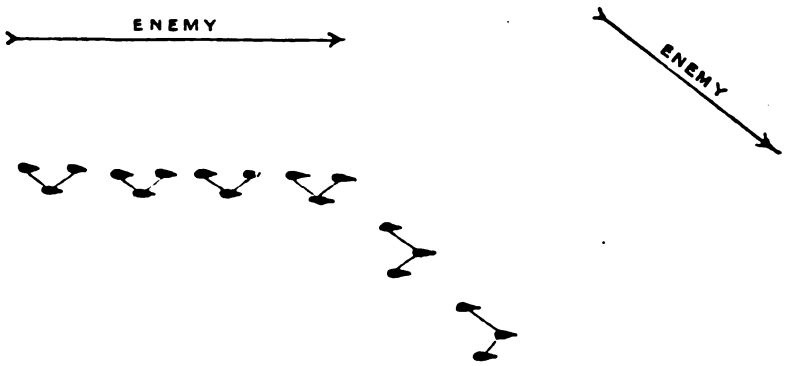
There were moments in which three ships were disposed one behind the other, in a situation of the utmost disadvantage, which would have had most disastrous consequences. In the same afternoon Captain Moreau was given a degree of initiative, and the grouped divisions passed in their relation to one another into various formations, as best they could, to meet the changing manœuvres of their mobile adversary.

Criticisms of observers.

On the fourth day both sides had complete liberty of movement. Captain Moreau's division steamed in line ahead, his vessels altering course in succession or together, with the object of maintaining the single line formation, sometimes approaching on one hand, and sometimes on the other, and the Fleet had continuously to manœuvre to meet the attack in the difficult formations required by the system. Often the captains were compelled to pay more attention to their

Fig. 5.



movements for safety than to the efficient use of their guns. In the afternoon a fresh breeze sprang up, and Captain Moreau was instructed to steam out of sight and then to approach and attack the Fleet from the rear, both forces manœuvring at twelve knots. The adversary being sighted, Admiral Touchard deployed his Fleet into the initial formation of groups disposed abreast of one another, but the swell on the water delayed the operation, and the adversary arrived abreast of the first and second squadrons while they were yet imperfectly formed, and masked entirely the fire of the third squadron.

Work of the Tactical Committee.

The correspondent who has been referred to describes the situation which resulted. The first and second squadrons, and the latter especially, would have had to bear for a full half hour the concentrated fire of their enemy, and at the same time the third squadron would have been unable to do anything to assist them, but would have received all the shells which were pitched too high to strike the ships

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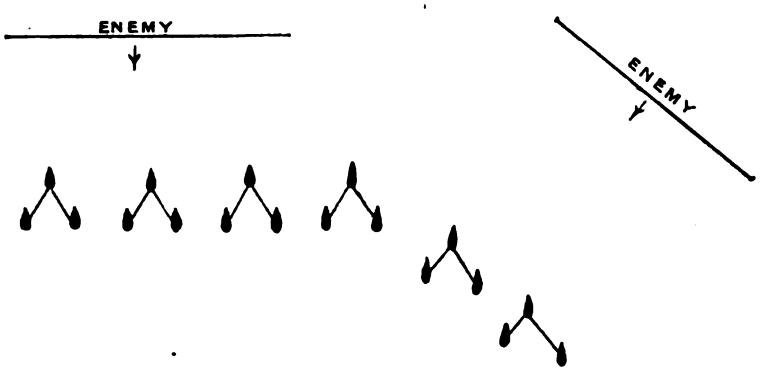
nearer at hand. The Tactical Committee had seen enough, and the work of the four days having been exhausting for the officers, Admiral Caillard and his colleagues decided not to continue the exercises on the fifth day, which had been allotted for the trials. They had themselves to undertake the arduous duty of examining the reports from the various ships, as well as the records of previous manœuvres and exercises, which fill many volumes.

Further comments.

But the officers of the Fleet had little doubt as to what the decision would be. Admiral Touchard stated in an interview that a change of formation with the grouped divisions could not be executed in less than twenty minutes, during which time the situation of the Fleet would be most precarious. The *Yacht*, in a critical article, described the development of the Fournier tactics into a system in which the initiative of the group commanders, originally proposed,

Fig. 6.



was subjected to the central direction of the Admiral. It remarked that the new tactics seemed acceptable in 1905 and 1906, because the Fleet manœuvred against an imaginary enemy, and, on occasions when the enemy was represented by a skeleton force, his movements were precisely regulated beforehand. In these conditions the Fleet could manœuvre with certainty, though inexperience or inability to execute the difficult movements were sometimes apparent when one ship masked the fire of another. In 1907 the lessons were more striking, for the skeleton enemy was now given complete independence, and it was seen that the Fleet would have been vanquished and destroyed. Too much time was occupied in assuming the required formation; disorder and confusion resulted; fire was masked and everything rendered the position of Admiral Touchard untenable. The smallest change in the movements of the enemy took the Fleet by surprise, rendered it vulnerable, imposed upon it arduous move-

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ments to meet the change, and placed it in such a position that under actual fire it would have been annihilated. Admiral Fournier had himself written that those who expected victory to result from the inspirations of the Commander-in-chief of a Fleet lost from sight the fact that he himself might be compromised, however great his genius, by some bad formation. With rational tactics, he said, and constant and methodical preparation, protecting the Admiral from the risk of improvised movements, the Fleet would always be in a position to conquer. It seems, however, that though Admiral Fournier was reputed to possess a temperament characterized by enterprise and audacity, in which everything would conduce towards the offensive, this system of tactics had led him to the adoption of formations which were radically defensive.

Comparison with Nelson's principles.

Such a system is the direct negative of that adopted by Nelson, as our French friends have not been slow to remark. For the great Admiral was always ready to give responsibility and the opportunities of right initiative to his subordinates, just as he had seized them himself. In his famous Secret Memorandum he said that, thinking it almost impossible to bring a Fleet of forty sail into a line of battle in difficult weather, he had made up his mind that the order of sailing should be the order of battle. He did not desire that his Fleet should have to take a battle formation in the presence of the enemy and in the approach to the conflict. He therefore said that his second in command, knowing his intention, would have the entire direction of his line, to make the attack upon the enemy and to follow up the blow until they were captured or destroyed. Observers of the French exercises were unanimous in condemning deep formations and the manœuvring of a Fleet in masses in which there was risk or certainty of the fire of some ships being masked. The object of tactics is not manœuvring but the advantage of fire. We are reminded irresistibly of the battle of the Lizard in the British manœuvres of 1901, in which the slow-moving Fleet, disposed in sub-divisions in line ahead, was seriously imperilled by its quick-moving adversary getting ahead and concentrating fire upon the leading ships, while those in the rear could do little or nothing to assist.

The Fleet target practice.

The manœuvres concluded with target practice on 29th and 30th July, which was conducted upon a system that is not new to the French Navy, having little in common with the gun-layers' tests and battle practice of the British Fleet. The object was to test the efficiency of the triangular grouped formations for the development of fire, but inasmuch as the course was upon a straight line, with one slight change of direction, and the ships maintained

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their relative positions, this exercise had little importance from this special point of view. Another object was to note the effect of the simultaneous fire of three ships upon a single target representing a large ship of war. Two of these special targets were prepared and moored in the roadstead of the Salins d'Hyères. They were formed severally of two large targets completed at each end by two wing targets, the whole length being 210 ft., the height more than 26 ft., and the tops of the masts about 66 ft. above the water-line. The range varied between 4000 mètres (4375 yards) and 6500 mètres (7108 yards). Observers were placed to note the fall of the shell, but this was unknown on board the ships, except as it could be observed, and the object was to apply advantageously methods based upon the situation that would exist in actual fighting. The weather was good on both days, and the sea smooth.

Disappointing results.

The results were in many ways disappointing, for the huge targets were little damaged, though each of them had been subjected for a period of some twenty minutes to the fire of a dozen battleships. The practice was not, therefore, very accurate, though it was observed that the targets were constantly surrounded by the points of fall. It thus appears that the dispersion was considerable, and the density of fire in each part of the area small. Fire control appears to have been good, and the clear weather and smooth water made the work of the gun-layers easy. The ships were moving at from 8 to 10 knots.

Defective guns and ammunition. Premature bursts.

It was demonstrated that, whatever might be the defects of the marksmanship, the excessive dispersion was attributable to the guns, and more than all to the irregularity of the powder. Still more surprising and alarming was the fact that a considerable number of projectiles, which were charged with black powder, burst in flight, and never reached the targets at all, the percentage of hits being thereby diminished. In previous years there had been some premature bursting of shells from smaller guns, but in 1907 this occurred chiefly with the 12-in. and other heavy guns. In the Carnot there were three premature bursts out of five rounds with the 12-in. guns, and one out of six with the 10·8-in. The République had one premature burst of a 12-in. shell and not less than sixteen with the 6·5-in. In the Suffren the proportion was six out of twelve for the 12-in., and proved high for the 6·5-in., while in the St. Louis there were not less than eleven premature bursts in twelve rounds from the 12-in. guns. Owing to the high velocities, no damage resulted from the fragments, but shells burst little more than fifty yards after leaving the muzzle of the gun, spreading fragments over the water to a distance of 600 or 700 yards. If the shells had been loaded with mélinite more serious consequences might have followed. In regard

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to the actual practice, it was noted that the rapidity of fire was greater than in previous years. The Suffren and République, firing together at the first target, made 13 per cent. of hits with their medium armament and 55 per cent. with their heavy guns. The République fired five rounds and the Suffren six rounds with 12-in. guns, but there were two premature bursts, and of the nine effective shells five hit the target. At this target the Charlemagne, which belonged to the same group, did not open fire, but at the second target, when she also fired, the medium armament made 17 per cent. of hits and the big guns 18 per cent. The results were better in the second division than in the first, but the best averages were obtained by the second division of the Northern Squadron, in which, on the average of the two targets, there were 31 per cent. of hits.

Remarks on French ordnance and explosives.

The firing, and its remarkable circumstances, created a profound sensation in the French Navy and in all ordnance circles. Many officers attributed the premature bursts to excessive pressure, holding that the fuses, which were mostly of an old pattern, were barely considered safe with ordinary velocities, and were too sensitive to withstand any considerable acceleration. Full charges were used. The gravity of the situation was brought home to the authorities, and the Minister of Marine expressed his energetic determination to take the necessary steps without delay, and to throw light upon the whole question. Taken in conjunction with some incidents on board the Suffren, in which there had been premature bursts of shell, and with a disaster on board the Couronne, gunnery school, which took place on August 2nd—two officers and two men being more or less seriously injured, owing to a shell bursting before the breech was closed—the seriousness of the situation has led to much enquiry, but this account of the manœuvres is no place to deal with the question.

Italian Manœuvres.

Features of the Italian operations.

The Italian Manœuvres were a continuation or rather further development of the operations of 1906. They included the very useful exercise of creating improvised naval bases at Augusta and Syracuse; tactical exercises developing from a strategical situation, which were an excellent test of the qualities of the *personnel*, but did not altogether resemble the operations of actual warfare; and some battle tactics of interesting character. The relationship of the schemes of one year to those of its predecessors offers the advantage of permitting the progressive study of the particular problems. In the Italian operations, they were concerned with the efforts of

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two opposing squadrons to unite in the vicinity of the Strait of Messina in view of a possible attempt to effect a military occupation of Sicily.

Improvised naval bases.

On the morning of 28th September the Naval Squadron of the Mediterranean, under command of Vice-Admiral Di Brocchetti, and the Reserve Division and torpedo-boats, under that of Rear-Admiral Chierchia, began the work of establishing naval bases at the two places named. A like exercise took place in 1906 at Augusta, Syracuse, and in the Gulf of Taranto, the work then being carried out at the two former places entirely with the resources of the ships. But in 1907 it was wisely decided to supply materials, and therefore the Garigliano was employed as a transport for guns, electric apparatus and materials for booms and obstacles, while the Goito was attached to the squadrons for mining and other purposes. The work was executed with great activity. Batteries were installed of 12-pdrs. and smaller guns, as well as wireless telegraphy, searchlight, and signalling stations, and communications were established by night and day between the forces anchored respectively at Augusta and Syracuse. At the latter port the booms were not actually placed in position in order not to interfere with commercial shipping, but this was done at Augusta, where there is not so much traffic. Searchlights were placed at the entrance to the harbours, and torpedo flotillas established a patrol of the approaches. For the first time also the balloon carried by the Elba was brought into use, and was employed to watch the approaches, transmitting intelligence by telephone to the cruiser to which she was attached.

Attacks on the improvised bases.

On the night of September 30th the ships carried no lights, and made no use of their searchlights, leaving the service of exploration to those at the harbour mouths, and to the torpedo-boats and the balloon. The night was clear, but with some wind, and the work of the balloon was conducted with difficulty. In the course of the night and at various intervals there were four attacks at Augusta and as many at Syracuse, but the boats were all discovered in the approaches to the harbours, and were frustrated in their attempts at surprise. On the next night the boats attacked in flotillas, three times at Augusta, and five times at Syracuse. The balloon then rendered excellent service, and the observers were able to keep watch upon the illuminated zone until midnight, the weather being calm, and probably favourable to the defence. In these conditions the torpedo craft failed to attain their object. The exercises, however, were very instructive, and officers and men displayed the greatest keenness both in the organisation of the bases and the utilisation of the means of defence.

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The tactical scheme.

On October 4th the vessels were divided for the purposes of the tactical scheme into the Blue and Red Fleets, the former consisting of two squadrons. The following was the organisation of the Blues:—

Squadron A:—Regina Margherita (flag of Vice-Admiral Di Brocchetti), Benedetto Brin, Emanuele Filiberto; the cruiser Agordat; the 1st flotilla of destroyers and a flotilla of first-class torpedo boats.

Squadron B:—Varese (pennant of Captain the Duke of the Abruzzi), Garibaldi, Ferruccio; the cruiser Coatit; the 2nd flotilla of destroyers.

The Red force was constituted as follows:—

Sicilia (flag of Rear-Admiral Chierchia), Re Umberto, Sardegna, St. Bon; the cruiser Iride; two flotillas (of first-class and second-class torpedo-boats). The Peimonte was attached, but had no fighting value. She acted as the mother ship of the torpedo flotillas. The Elba was also attached to the Red Fleet for mining service and the employment of her balloon.

The Lepanto and other vessels were present, with Admiral the Duke of Genoa, for the inspection of the defences and the duties of direction, and the Regina Elena, escorted by two destroyers, had on board the King, the Count of Turin and the Minister of Marine. In the first phase "A" and "B" on the Blue side, respectively assigned a value of 85 and 75, were to proceed, "A" from the south, and "B" from the north, to endeavour to effect a concentration, in despite of the Red ships, which had their base at Messina, and had a value of 100, and of the guns which defended the Strait. The co-efficients were considerably modified under the rules when the shore guns came into action against the ships.

The operations.

The limit of operations of the Blue "A" Squadron were defined on the south and east of the Strait by a segment of a circle drawn from near Acireale in Sicily to a point on the Gulf of Squillace. A somewhat larger segment of a circle on the north-west, drawn from San Stefano in Sicily to a point near Paula in Calabria, and including the Lipari Islands, marked the sphere of operations of the Blue "B" Squadron. At 2 a.m. on the 7th October, the Red Squadron being at Messina, the Blue "A" Squadron was in lat. 37° 35′ N. and long. 16° 15′ E., and the "B" Squadron in lat. 39° 10′ N. and long. 15° 46′ E. The Blue destroyers were despatched to observe the northern and southern approaches to the Strait, while the torpedo boats were to penetrate further and gain touch with the Red Squadron if possible. In the same way the Reds had their torpedo boats patrolling to the north of the Strait, and on the south on the parallel of Cape Spartivento. The Red Commander also sent the Piemonte along the coast to Taormina, with instructions to use searchlights and fire guns with the object of misleading the Blue

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Admiral. This ruse, however, failed, and during the night the opposing torpedo craft saw nothing of one another. Fighting in the Strait of Messina.

At 6 a.m. (October 7th) the Blue "A" and "B" Squadrons were respectively on the south and north of the Strait, some miles outside the area commanded by the shore guns, their object being to compel the adversary to reveal himself. When he was discovered the Blue Squadron, which was seen to be nearest to the Red force, would endeavour to maintain a distance outside the limit laid down for tactical contact in such a way as would enable the other Blue Squadron to approach, thus concentrating a superior force simultaneously. The object of the Red Admiral was to oppose this procedure and to bring his adversaries under the fire of the shore guns. His vessels, under the protection of these guns, had been distributed—the Sicilia, Saint Bon, and Re Umberto on the coast of Calabria, and the Sardegna and Iride on the coast of Sicily, while the Elba was at Reggio ready to send up her balloon.

The Blue Squadrons approached in line ahead, while the Red force, which had been concentrated in the night, was in the vicinity of Punta Pellaro going south at slow speed. On discovering the Blue "A" Squadron, Rear-Admiral Chierchia turned to the north to avoid tactical contact with the enemy, while the Blue "B" Squadron entered the Strait from the north. Upon seeing this manœuvre the Reds turned along the coast of Sicily under the shore guns, placing the Blue "B" Squadron in some difficulty. "B" had learned, however, from his destroyers of the approach of "A," and he therefore entered the Strait, being attacked by the enemy's torpedo boats near Cape Peloro. "B" proceeded on his course, and arrived near Messina; but perceiving that his relative distance to the "A" Squadron and to the Red enemy would not enable him to come within the required distance for tactical union with his friend, he altered course, and proceeded towards the mouth of the Strait in order that the "A" Squadron might seize an opportunity to approach with advantage. But fourteen "B" ships had been under the fire of the forts, and it being unwise to prolong the engagement the Admiral once more entered the Strait, and an action began with the Reds at 7.45 a.m. The Red Squadron was placed at a disadvantage, and appears to have had its T crossed by the Blue "B" Squadron, "B" altering course to maintain his advantage. By this time the "A" Squadron had entered the zone of fire of the shore batteries, in order to attack the rear of the Red line. Shortly afterwards the operation was concluded by signal from the Director of the operation, the prescribed period of twenty minutes having elapsed from the opening of the action between the Blue

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"B" Squadron and the Red Squadron, while the "A" Squadron had not been in effective contact with either of them.

The second exercise.

There was a second exercise on the night of October 7th and the morning of the following day, which reproduced the conditions of an attack by a naval force on the coast works of the Straits of Messina and on a weaker squadron which opposed the attempt. The operations were of a spectacular character, and included torpedo operations and many interesting tactical movements. The principle of the attack upon the coast works was to concentrate the fire of several vessels upon one of them at the same time. These exercises took place in narrow waters. They exercised the skill of officers in the handling of their vessels, in operations against opposing ships and shore batteries; they gave opportunity for the handling of many vessels steaming without lights in these particular conditions; they were a valuable training for the men in the coast batteries, and they were not without interest from the point of view of scouting by means of torpedo craft. That they represented such operations as would take place in actual warfare it is scarcely possible to believe. No squadrons which valued their safety would attempt to unite in the narrow waters of an enemy, actually under the fire of shore batteries, and in the presence of a Fleet superior to either of them, even if inferior to the two united. It is not probable that in naval warfare ships of war will ever, if they can avoid it, employ their guns against land fortifications in such conditions as were illustrated in the Italian manœuvres, however effective long range fire well directed may yet prove in other circumstances. The value of the operations, therefore, may be taken to reside in their instructive features as a series of exercises demanding much from the intelligence and skill of officers and the endurance and handiness of men.

Battle tactics.

The operations concluded with battle tactics on October 8th. Two naval forces, of which one (Blue) had better speed than the other (Red), were approaching one another with the object of bringing about an action. The swifter force, at an opportune moment, was to divide into three sections, and to attempt with two of them to concentrate on the two extremities of the enemy's line, while the third division opened fire upon a parallel course, maintaining the greatest distance possible for effective action. Two sections of the Blues steamed at 14 knots, and one at 12 knots, while the Reds had a speed of 10 knots. The Blue Admiral opened the engagement in the manner described, and a series of manœuvres followed in which an attempt was made to direct a concentrated fire upon particular parts of the Red line, while the slower Red Fleet was endeavouring to throw a preponderating force upon the two Blue divisions which

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were nearest. When the action had developed, after steam tactics occupying two hours, the Director signalled a cessation of hostilities. Other tactical exercises of a like character followed, and the manœuvres concluded with an inspection on October 18th. They had been full of incident, and had profoundly interested all who had been engaged in them. This account is based mainly upon an excellent description given in the *Rivista Marittima*.

German Manœuvres.

No information of practical value is available concerning the German Manœuvres, which concluded on September 7th. They were curtailed by much fog and bad weather, and are understood to have consisted of a series of tactical exercises, and of a strategical scheme covering two days based upon the attack and defence of the mouth of the Elbe. The operations, including target practice, were carried out to the satisfaction of the Emperor, who witnessed the manœuvres, accompanying the Fleet in the Hohenzollern, and sometimes going on board the Deutschland. The Island of Heligoland has been heavily fortified, and the value of the new works was fully demonstrated by their successes against the ships during the operations, showing that the bay of Heligoland cannot be seized by an enemy's Fleet. Prince Henry of Prussia acted as chief umpire during the operations, and at their close the Emperor paid a cordial tribute to the abilities which his Royal Highness had displayed during his first year as Commander-in-Chief of the High Sea Fleet in the North Sea. The Emperor remarked that the complete success of the manœuvres had justified the imperial confidence in Prince Henry's qualities as a seaman, a strategist, and a leader of men. The Emperor also commended all ranks for their energy and efficiency, and paid a special tribute to the excellent work of the engine-room complements. Some question had been raised in various quarters as to whether Prince Henry possessed sufficient training and experience for his important duties, and the renewed confidence shown by the Emperor was calculated to dispel any doubts.

Swedish Manœuvres.

The Swedish Navy was engaged in short manœuvres, the theme of which had reference to the defences of Stockholm. It was a question of whether an enemy could possibly force the entrance. The exercises gave confidence that such a result would be impossible.

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The entrance to Stockholm is protected by more than 7000 islets, and the navigation is impossible without experienced pilots. In time of war the passages might be mined, and the danger to an enemy from this source and from the torpedo craft, which would have every advantage in those narrow waters, would certainly deter an enemy from any attempt to approach the capital. At the same time it was pointed out that the defensive system, by means of mines, should be further extended, and that the flotilla of submarines should be increased.

JOHN LEYLAND.

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CHAPTER V.

The Armoured Cruiser Question.

It would seem that there really is an "armoured cruiser question." Why should there be one? There is not, in the same sense, a battleship question, or a destroyer question. It is true that there are differences of opinion as to details of design of each of these two classes of ship, and as to some particular mode of employing them; but the advisability of having them is generally admitted. Why it should be otherwise with the armoured cruiser is worth looking into. A decision concerning the case ought not to be formed until the considerations on both sides have been duly weighed. There has rarely been a case in Naval policy into which prejudices—or judgments given before hearing the arguments *pro* and *con*—enter more easily or have entered more persistently. The uncertainty exhibited by writers who describe them, as to the class in which some of the latest armoured cruisers should be included, justifies a belief that the vessels are hybrids. The hybrid has few friends amongst its kindred. The mule will not admit its relationship to the ass, and is disowned by the horse. All the same, progress in the floating material of navies has been largely due to a process that is closely paralleled by cross-breeding, but cross-breeding between classes as near together as varieties or species and not so far apart as *genera*.

The altogether unscientific and even blundering nomenclature adopted of late years for the classification of men-of-war has had a good deal to do with the production of doubt as to the belligerent rôle of the armoured cruiser. Inexact terminology almost of necessity causes confusion of thought. No seaman, perhaps no landsman, conversant with the history of naval warfare, could have suggested such an evidently absurd designation as "battleship" for a man-of-war, or have proposed "cruiser" as the name of a class. Acquiescence by naval officers in the currency of these absurdities can only be attributed to the readiness with which men long habituated to deal with things and facts yield to the presumption that one need not trouble oneself about words. As a rule the presumption is sound, but like other rules it is not without exception. "Line-of-battle ship," or its equivalent, "ship-of-the-line," was a scientific connotation because it denoted a class of vessel and also denoted the mode of

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employment in war that differentiated the class from others. "Cruiser" was a general term embracing many classes, and was applied with perfect propriety to a line-of-battle ship, or a frigate, or a brig; provided that each was a man-of-war and capable of making a cruise.

Using an essentially general term as a particular designation encourages unregulated fancies as to its application, and produces the confusion of thought already alluded to. This is equally true of the converse. We have, close at home, an example that ought to be dwelled upon. The use of the word "destroyer," in a general instead of in a particular sense, has produced highly important consequences, which can be described and be traced back to their origin. In the early years of the history of the torpedo-boat the methods proposed for defence against an attack by her were almost exclusively passive. Even the guns to be directed against her were stationary on board the ship threatened, or at some point on shore. Study of the tactics that would be adopted by torpedo-boats brought into prominence the desirability, indeed the necessity, of counteracting them offensively. After full investigation it was determined to test by practical experiment the conclusions which had been arrived at theoretically. Accordingly, in the manœuvres of 1892 a force of torpedo-boats, carrying their gun-armament, but without torpedoes, was put under the orders of an officer of exceptional attainments, the late Rear-Admiral S. Long, who had not long before relinquished the command of the torpedo school-ship Vernon.

The object of the impending operations, viz., to furnish a test of the value of offensive defence against torpedo-boat attack was explained to him. The manœuvres were carried out with a most instructive result. The offensive defence against torpedo-boat attack succeeded completely. The boats, which previously had only passive defence to encounter, and had not been obliged to take careful precautions for their own safety, whilst proceeding from their bases to the objective point, had now to provide against being attacked themselves. This so hampered their movements that their efforts against their enemy's ships everywhere failed. In describing these manœuvres Mr. J. R. Thursfield, in the pages of the *Naval Annual* (1893; Chap. X.), said: "The result abundantly justified the tactics employed. In no single instance during the operations was a torpedo-boat successful in its attack on an ironclad." The manœuvre operations approximated much more closely than those of other kinds to the procedure of real warfare, and the theoretical conclusions which had led to the adoption of active aggressive tactics were con-

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firmed by practical experiment. The method, it will be seen, was thoroughly scientific.

The combined testimony of theory and practice established the necessity of constructing a class of vessel able to counteract the torpedo-boat menace, believed before that to be overwhelmingly formidable. Here we had a class the design and capability of which had been dictated by exact compliance with scientific principles. The new craft were meant to defeat torpedo-boats, and were, therefore, named torpedo-boat destroyers, that is, destroyers of such boats. The inferiority in lucidity of the English language to the French was soon apparent. English admits more readily the cumbrous term "torpedo-boat destroyer" than the more explicit "counter torpedo-boat," which appeared, naturally as it were, in French as *contre-torpilleur*.

It was not supposed that the new designation would be open to a double meaning. This, however, was to reckon without the specialists. As "snake poison" may be either a compound for the destruction of snakes, or the venom that flows through their fangs, so it was discovered that "torpedo-boat destroyer" might mean a torpedo-boat that destroys ships as well as a craft for destroying torpedo-boats. The consequences were soon seen. The destroyers were equipped with a torpedo armament, and their *raison d'être* was changed. They were virtually converted into larger torpedo-boats, and the threatened diminution of the assumed importance of the torpedo was avoided, and indeed converted into a means of extending equipment with that weapon. The results in actual warfare, as shown recently, have not been brilliant. Concentration of mental effort on some detail of material necessarily leads to neglect of the essential conditions of naval warfare as a whole. This now seems to have been perceived, and the gun-armament of the "River Class" destroyers is being made heavier.

In this we may find the explanation of the characteristics of recent armoured cruisers. The attitude of mind to which we must attribute undue exaltation of war material, in spite of the fact that it remains inert till made operative by the human will, is probably more common now than ever. Armour-plating was originally applied to the cruiser to protect the structure of the ship, not to shelter her crew against an enemy's shot. The earliest "armoured cruisers" belonged to the Russian Navy, and had only a belt of water-line plating. It is, no doubt, difficult to understand why the great and long-experienced British Navy should have copied a design from the Russian. The explanation of this must be that the doctrine of the preponderating importance of material in war was then

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beginning to make itself felt. The natural inclination of our Naval officers to look at proposals for new designs of ships from the point of view of the strategist and tactician was borne down by a flood of words about armour, *vis viva*, striking velocity, penetration, etc. Mathematical formulæ flew about as abundantly as projectiles of medium calibre at the sea-fight of Tsushima. Inconveniently inquisitive tacticians, who wanted to know why it should be taken for granted that there was no way of competing with a naval rival except by building a bigger and more thickly armoured ship, were pelted with $\frac{W v^2}{2g}$, and were supposed to be reduced to silence by broadsides of $\frac{d^2}{W}$ and $\frac{W}{d^3}$. Nevertheless, like the "solitary Cocker," they continued to assert that two and two make four in strategy and tactics as well as in simple arithmetic.

It is, therefore, not altogether surprising that the armoured cruiser should have been admitted into our lists, and should have gone on "developing," as it is called. An early "development" was the application of protective plating to the gun-positions. The mental confusion due to using inexact terminology, which failed to indicate the proper distinction between the battleship and the "cruiser," was disclosed by the method of armouring the gun positions of the latter. The positions of the fewer guns—apparently in imitation of the battleship—were in many armoured cruisers more heavily armoured than those of the more numerous. This arrangement gave what was held to be adequate protection to the small section of the crew manning the cruiser's heavier guns, and left with only imperfect protection the greater section manning the others. To carry a heavy gun armament is a primary function of the battleship; and there was much to be said for protecting it with the thickest plating that the design would admit of. The "cruiser" is not primarily a ship to carry very heavy guns, and in her case arguments, the validity of which in the case of the battleship might be conceded, did not apply. This seems now to be accepted, as the more recent armoured cruisers usually have as stout protection for their secondary armament positions as for those of their heavier guns.

The armament of the armoured cruiser, considered together with the protection given to her, suggests some serious reflections. In the first place, she was fitted with torpedo-tubes which could not be used effectively unless she were to approach an enemy so closely that her thickest armour-plates would afford little or no protection against the hostile fire. Also, she was armed with some guns, sometimes of 9·2-in., and more recently of still greater calibre, which could perforate armour equal to her thickest at long range. What could have

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been the reasons that prompted the adoption of this armament? Was it supposed that the ship would encounter antagonists carrying guns as heavy as her own? If so, of what use as a protective arrangement would have been even her thickest armour-plating? If, indeed, she were to meet a ship less powerfully armed than herself she might then be expected to get the best of the encounter. On no other condition could success on her part be credited to her material equipment. To fulfil the condition it would be necessary that a more powerful, or, for the matter of that, equally powerful, antagonist should never be fallen in with. What sort of probability is there that a belligerent will always meet just the opponent that he wants to meet? If that is possible for one side in a contest, why should it not be possible for the other?

That admirers of the armoured cruiser type of man-of-war must have felt this is disclosed to us by the further development given to the class. The 12,000-ton ship of 1899 with two 9·2-in. guns "developed" into the 13,550-ton ship of 1905 with six 9·2-in. guns; then into the 14,600-ton ship of 1907 with four 9·2-in. guns; and lastly into the still unfinished Invincible of 17,250 tons and eight 12-in. guns. The last mentioned design can be attributed only to counsels of despair. The hope that one of our own armoured cruisers would never fall in with an antagonist superior or equal to her was at last felt to be fallacious. It was evidently assumed that the only way to redress the balance of fortune was to make the ship so big and to put on board her such huge guns that our naval rivals would retire discomfited from this contest in size and costliness. Had all other naval Powers consented to stand still the assumption might have been reasonable. To stand still in the face of our efforts at "development"—a word as blessed in some ears as Mesopotamia—was just what other naval Powers, probably gloating over the want of perspicacity that prevented its being perceived, were resolved not to do. So there was nothing for it but to abandon the contest or start again on the weary round of trying to out-build our rivals, and again with the same result. We resorted to the desperate measure of trying to turn out an armoured cruiser which should—beyond expectation—exceed in dimensions, weight of armament, and cost, all the cruisers possessed by foreign Powers. The result was the design of the Invincible, to displace 17,250 tons and carry eight 12-in. guns. The Secretary of the Admiralty said in the House of Commons, on the 27th of July, 1906, "The Dreadnought to-day costs from start to finish £1,800,000, and the new cruisers of the Invincible class very nearly as much." The cost of the latter has been more precisely stated to be £1,756,925. Despair has been a bad counsellor. The

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Germans, before our Invincibles could be completed, started the building of a class of armoured cruisers which are to surpass ours in cost and, as far as can be foreseen, in size. The "estimated" cost of their cruiser F is £1,791,788, and it is reported that this ship is to be exceeded by another provisionally named G.

As has been mentioned, the tactical efficiency claimed for the monster armoured cruiser is chiefly dependent on the condition that she meets an opponent of less fighting power than herself. A characteristic of the class is a high rate of speed. If the ship has a speed superiority it is not necessarily due to her great size, her absolute speed being considerably below that, for example, of the much smaller destroyers. Also, her fuel endurance, taken absolutely is not greater than that of cruisers of considerably less displacement. Taken in combination with her other marked characteristics—heavy armament, moderately efficient armour protection, high freeboard—the speed and fuel endurance of the armoured cruiser have a value which must not be ignored, but which it is easy to over-estimate. In a rough sea she should be able to out-pace vessels of less size; and when these vessels have to contend against unfavourable weather she should be able to out-stay them. The latter, however, can only be counted upon when, at the beginning of the endurance test, the proportionate quantity of fuel of each side is equal. This cannot be expected to happen often, because greater relative numbers of the smaller class may be expected to facilitate more frequent issues from base-ports and consequently greater probability of meeting when the big armoured cruiser has already used up much of her fuel, whilst that of the other side is still but little short of the full amount.

These considerations introduce us to the investigation of the strategical capacity of the big armoured cruiser, which might be summed up in the answer that can be given to the question, How is she to be employed in war? The contention that in the defence and attack of ocean commerce she would prove so formidable that her construction has rendered all smaller cruisers useless appears to have been abandoned. It is suggested, rather than specifically asserted, that there will be no such thing as "commerce-destroying," and consequently no need for commerce defence in future wars. One wonders why those who hold this sanguine view do not go, as they reasonably might, just a step farther and say that there will be no more war. Commerce-destroying, it is assumed, will not be practised because of its inutility as a belligerent operation, and because it can be prohibited by international agreement. It would take a chapter of the *Naval Annual* to demonstrate that the inutility of commerce-destroying in war is conditional, not absolute; and that, given the

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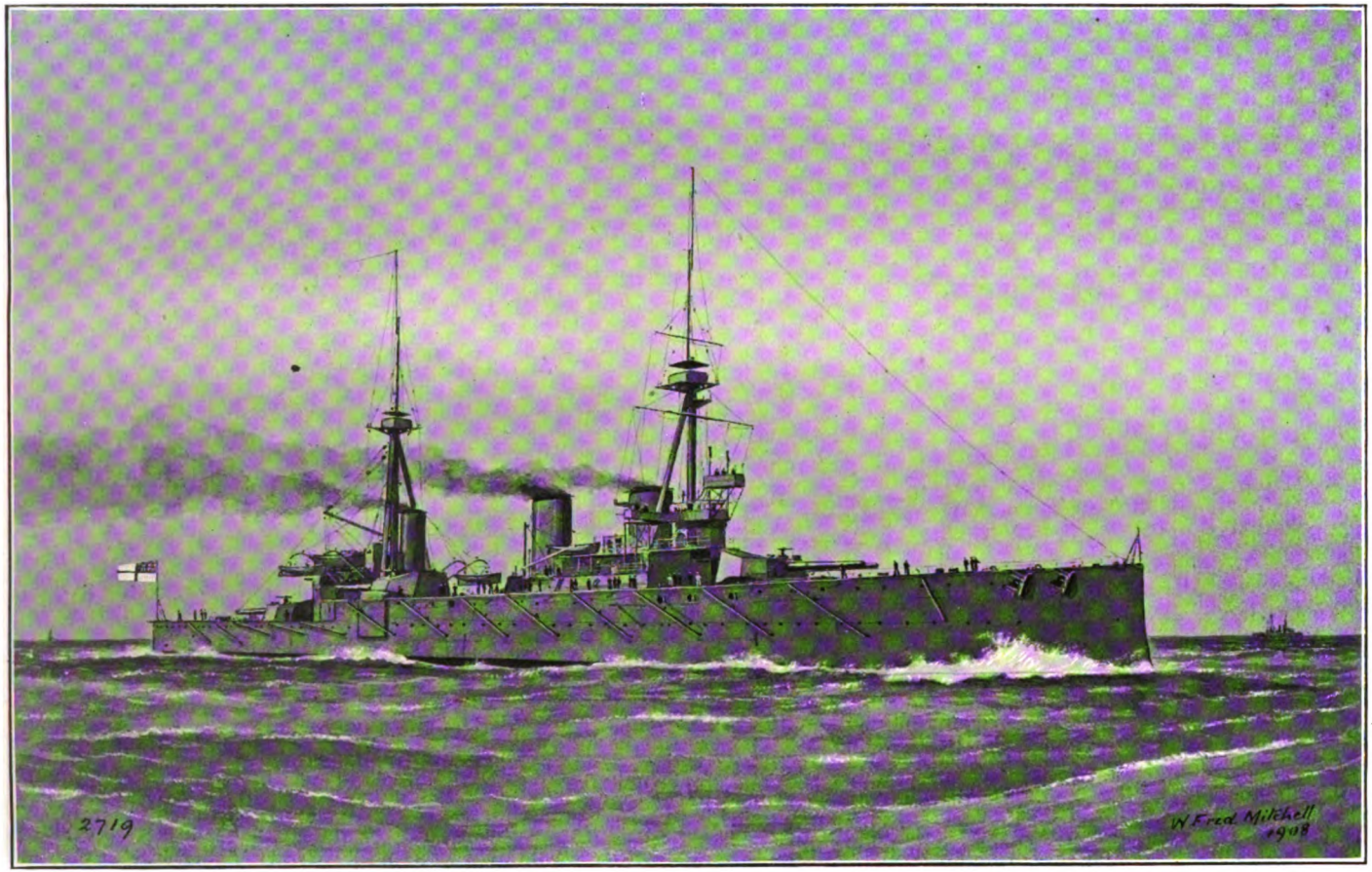

H.M.S. INDOMITABLE.

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right conditions, it will prove again, as it has proved before, a formidable weapon in some hands. An international agreement, necessarily formulated in time of peace, to stop a particular war operation likely to be favourable to some future belligerent will have exactly the same efficacy when two parties are heated in a life-and-death struggle as may be possessed by a peace-time agreement not to enter into a struggle at all.

If we were to accept the opinion that commerce-destroying and, as a consequence, commerce-defence will have no place in future maritime wars, we should still have to determine the question—Of what belligerent utility is the armoured cruiser likely to be? It is universally agreed that the numbers in the class will be small, at any rate as compared with that of craft of moderate size. To what service can a ship, nearly or quite equal to a real battleship in size and cost, be assigned in war? Restriction of such a ship to the work of a despatch carrier—especially in these days of wireless telegraphy, in which, however, some despatch carrying is still likely to be found necessary—would be similar to the proverbially inappropriate procedure of using a steam-hammer to crack a nut. It would be not much less wasteful of power to use her as a look-out ship. From the quandary in which advocates of the armoured cruiser as a type have involved themselves, when confronted with the question of her belligerent utility, an attempt at escape has been made by proclaiming her suitability as a scout. The conception of scouting disclosed by this is almost startling, and gratitude is due to those who have condescended to give an explanation of it. It is desirable, indeed it may be of very great importance, to keep touch of an enemy's fleet. This is a truism. At all events no one will dispute it. To do this, we are told, the armoured cruiser will be necessary. Why? Because if she is hanging on to the hostile fleet, she will be too strong to be driven off.

Let us examine this assertion. No armoured cruiser yet produced would be more capable of maintaining her post of observation in spite of opposition than one of the Invincible class. The Admiral to whose side she belonged, if his fleet were not considerably superior to that of his enemy, would be almost recklessly venturesome if he were to detach so important a portion of his force, as an "Invincible" would really be, for the purpose of doing what a greatly inferior vessel could do equally well. The inferior vessel alluded to could do the observation work, opposition notwithstanding, just as well as the huge cruiser, because the result of efforts to drive off an observing craft would depend much less on her intrinsic qualities than on the determination of the enemy to get rid of her.

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It may be taken as certain that the enemy will not allow himself to be observed if he can help it. There is something highly refreshing in the simplicity that assumes that an enemy will not proportion the means he employs for shaking off an intruder to the strength that that intruder may be able to put forth. Although the enemy may have no "Invincibles" of his own to use in driving away a ship of the class, it is attributing to him exceptional ineptitude to suppose that he will permit his arrangements to be made the object of undisturbed hostile inspection, or that he will deliberately employ inadequate means—that is, in this case, less powerful vessels—in the hope of sending the observing cruiser flying back to her friends. Of course he will, if necessary, use battleships of superior force to compel her to make off. Here, as always in the case of a fugitive, the high speed given to the armoured cruiser will help her to escape. During her flight there will be time enough for calculating the exact value of very heavy guns, the possession of which does not prevent her from being a runaway. If a reconnoitrer has to make off before he can complete his inspection it would seem to be of little moment whether he is in a big armoured or in a protected cruiser of moderate size, or, for the matter of that, in a hired and commissioned merchant-steamer.

An armoured cruiser of the more recent type is by herself, as above suggested, so considerable a fraction of the force to which she belongs that it would be well worth an enemy's while to capture or destroy her. A fleet that would not care to turn aside from its course to make an end of two or three Boadiceas might be well repaid for a digression if it ended in making a prize of, or sending to the bottom, one Invincible. When counting his strength and comparing it with that of his adversary, a Naval commander is not likely to leave guns out of the competition. We shall be pretty safe in crediting him with a desire, amounting when in the neighbourhood of the enemy to a determination, to keep as many as he can on his own side. When a fight is near at hand, which it would probably be if the hostile fleet were within reconnoitring distance, that he would send away in one group a broadside of eight 12-in. guns is so improbable that we may dismiss it from consideration. He may have some misgivings as to the efficiency of the protective armour of the ship whose guns he could so ill-spare at the moment; and these misgivings may be accompanied by a regret that the money expended on her had not been devoted to the production of a real battleship.

The more the armoured cruiser question is examined, the more difficult it becomes to fix the *rôle* which she could best play in war. The difficulty will not be escaped, if we accept Lord Eversley's

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conclusion, based apparently on authoritative information, that we are not going to build any more huge armoured cruisers.* We must hit upon some plan of employing those which we have already. If we may judge from their Navy Estimates, neither France nor the United States will continue the type.

POSTSCRIPT.

Since writing the above it appears that in the latest (1908–9) Navy Estimates provision is made for building one "large armoured cruiser." It is not said whether she is to be an Invincible or an "improved Edgar." That up to the 9th March, 1908, the difficulty had not been solved officially is evident from the statements made in the House of Commons on that date, as reported in the *Times* of Tuesday, March 10 :—

"Mr. BELLAIRS asked what was the nature of the programme. They knew there was one Dreadnought and another armoured cruiser. Was the latter to be an Invincible ?

"Mr. E. ROBERTSON [Secretary of the Admiralty], said that was just the sort of question he could not answer. He did not know that anybody knew. One would be a Dreadnought and the other probably an armoured cruiser, but types wanted great consideration."

Later in the discussion occurred the following :—

"Mr. BELLAIRS : 'I did not ask for details ; I asked whether or not it would be of the large armoured type.'

"Mr. LAMBERT [Civil Lord of the Admiralty] said that of course it would be of the large armoured type."

The country will like to know what meaning is to be given to the word "large." †

* Contemporary Review, No. 391, p. 631.

† Lord Tweedmouth has since officially announced that the armoured vessel to be built at Devonport will be a sister ship to the Invincible.

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CHAPTER VI.

Experience with Marine Turbines.

The most significant feature in naval engineering is the fact that in June next the last present-day British naval ship to be fitted with reciprocating engines—the armoured cruiser Defence—will make her official trials. All other new vessels for the British Navy are being fitted with turbines, and the machinery of this type for warships in commission or in course of construction aggregates 716,000 h.-p. This statement is of itself proof of the enterprise and courage of those responsible for the *matériel* of the Fleet; and, as indicative of the adaptability of our manufacturing firms, there is the coincidence that the constructors of the piston machinery for the Defence and the contractors for the turbine machinery of one of our latest warships (the Scotts, of Greenock) are the oldest existing manufacturers of propelling engines for warships.

Extent of use of turbines.

A change so momentous can only be justified by experience, and it therefore becomes important to analyse the available data regarding the marine steam turbine. It may at once be said, however, that seldom, if ever, has such a decisive step as the supersession of the reciprocating engine by the steam turbine been taken in naval engineering with less of adverse criticism by well-informed engineers. It is true that exponents of engineering practice, as applied to the propulsion of ocean steamers, have not, in all instances, commended the change; but there has been a ready recognition that the requirements of the Royal Navy were different from those of the mercantile service. Where high speed is aimed at, as, for instance, in cross-Channel service, the turbine has been widely adopted. It has been fitted also in ocean mail steamers, the Lusitania and Mauretania being outstanding examples. The turbines in British and foreign merchant vessels and yachts afloat or under construction have an aggregate power of nearly 650,000 H.P.

Foreign navies also have, by their action, approved the lead given by our Admiralty. In foreign navies Parsons turbines have been adopted for warships as follows:—In the French, 156,600 h.-p.; Russian, 120,000 h.-p.; German, 103,600 h.-p.; United States, 68,000 h.-p.; Brazilian, 38,400 h.-p.; Austrian, 20,000 h.-p.; Italian,

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22,000 h.-p.; and Japanese, 8000 h.-p. The total power of all turbines now made or on order for British and foreign naval and merchant steamers slightly exceeds two million horse-power, of which more than 90 per cent. are of the Parsons type.

Superior efficiency of Parsons turbine.

Theoretically the Parsons system is certainly regarded as conducive to high efficiency, and, when satisfactorily designed and well constructed, there is no reason why this theoretical advantage should not be realised. Unsatisfactory proportions either of turbine or propeller are accountable for most of the variations in the results attained in different ships. The efficiency of a turbine depends upon the ratio of the blade speed to steam speed. In land practice it is commercially possible to approach this theoretical limit somewhat more closely than in marine work, where it is essential to keep down the number of revolutions per minute in order to secure a reasonable propeller efficiency. In fact it is necessary in marine practice to effect a compromise between the speed best suited to the turbine and that best suited to the propeller. What is wanted in the propeller is a suitable ratio between the peripheral speed and the thrust. If too much work per square foot of blade area is demanded, then there is loss of efficiency due to cavitation. Similarly a high peripheral speed is unsatisfactory. Many experiments have been made, and the builders of turbine ships have tackled the problem with characteristic care. Where model tank experiments were possible, as in the case of the Admiralty, of Messrs. William Denny and Brothers, Dumbarton, and of Messrs. John Brown & Co., Limited, Clydebank, useful data were collected, while in other instances the performances of ships on speed trials were analysed; thus, although our knowledge of the action of propellers is far from being complete, progress is being made. The Dreadnought has carried out a series of trials with three different forms of propeller, and elaborate observations have been made; these will serve in some measure as guides for the proportioning of screws for succeeding ships. Unfortunately the requirements of the Service have hitherto militated against the continuity and comprehensive character of such experimental work. This question affects the efficiency of fighting ships to so great an extent that fuller opportunity should be given to the technical officers of the Admiralty to carry out practical experiments. There is some justification for expense and for any delay which may result in the commissioning of a ship in the fact that a change of propellers in vessels of the Drake and County classes increased the speed in all the vessels by one nautical mile per hour without requiring any addition to the power.

Even with the present comparatively limited knowledge of pro-

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pellers a high efficiency of turbine and propeller combined is possible, and experience has enabled the rate of revolution of the turbine to be reduced to suit propeller conditions. In land practice, where high rotational speeds are practicable, the peripheral speed of the blades of the low pressure end of a turbine has reached 21,500 ft. per minute, and those at the high pressure end 10,200 ft. per minute; but the propeller conditions present in marine practice have sometimes necessitated speeds of less than one-third of those given.

Problems in turbine design.

The diameter of the turbine should be as small as possible in proportion to the power required; the height of blades is then relatively greater, and there is consequently less leakage of steam between the tips of the blades and their proximate surfaces in the annular chamber.

It is important that the data adopted as the basis of the design of the turbines should apply to the working speed of the ship and not to higher trial-trip speeds. It is possible to overload a turbine to a very large extent and for long periods, and thereby even to improve the economy; but if the working speed is less than the designed speed economy is reduced. Extended trials in an 18-knot merchant ship showed that at 17 knots the coal consumed per unit of power per hour was increased by 4·5 per cent., at 16 knots by 10·2 per cent., and at 15 knots by 18 per cent.*

Turbine and reciprocating engines compared.

In some earlier designs over-cautious estimates were made of the power of the turbine, and thus in service the initial steam pressures had to be reduced much below those for which the turbines were designed, and economy was lessened. Recent experience has proved that steam consumption with turbines at the full designed output is considerably less than with reciprocating engines, all other factors being equal. Reciprocating marine engines require about 14·5 lb. of steam per I.H.P. per hour; the Amethyst in her quarterly trials has developed full power in turbines with 13·6 lb. of steam per equivalent I.H.P. per hour; the Dreadnought works out at about 13·4 lb. Some of the 33-knot destroyers of the Tribal class, in which the turbines have been overloaded, have a steam consumption of 14 lb. to 14½ lb., against 20 lb. to 21 lb. with reciprocating engines. A careful comparison of several of the Channel steamers shows an economy in steam consumption of about 15 per cent. These are all results of various applications of the Parsons system. Comparisons with other types are difficult owing to other variants. The only case in which complete data have been published for the Curtis turbine is that of the American coasting merchant steamer the Creole.† With a steam

* See *Engineering*, Vol. LXXXIII., p. 815.

† See "Journal" of the American Society of Naval Engineers, Vol. XIX., p. 761.

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pressure at the turbine of 250 lb., the thermodynamic efficiency works out to only 44 per cent. for 250 revolutions. In the case of the Dreadnought, which has Parsons turbines, the thermodynamic efficiency was 50 per cent. at about 250 revolutions and 61·5 per cent. at about 330 revolutions, although the steam pressure was greatly reduced at the turbines. The steam consumption in the case of the Creole was 16 lb. per equivalent I.H.P. per hour, with steam superheated to 74·5° Fahr. As to the possibility of using superheated steam with turbines, there seems no insurmountable difficulty in the Parsons system; the difficulty rather is to get a superheater which will maintain the superheat sufficiently steady to avoid the mechanical troubles otherwise likely to arise. It is claimed that for each 10° Fahr. of superheat the steam consumption in the turbine may be reduced 1 per cent.

Comparative coal consumption.

Coal consumption, although a less satisfactory basis for comparison of economy than steam consumption, is more popularly accepted and data are more easily got. As already stated results establish that at full speed the turbine is more economical than the piston engine. There are, of course, exceptions, but these are not due to causes inherent in the system. The King Edward, the first commercial steamer fitted with turbines on the Clyde passenger service, last season ran 9·14 miles per ton of coal at a speed of 18½ knots, as compared with 7·98 miles per ton in the case of a sister ship with less passenger accommodation, working at 16 knots. The Isle of Man steamer Viking, with turbine machinery, burned 20 per cent. less coal per mile than a sister ship with piston engines doing similar duty but at slower speed. The Dieppe, in the English Channel service, consumed 16 per cent. less coal than a steamer of the same size and power with piston engines. In the Ostend-Dover service the gain is 15 per cent. in favour of the turbine. The first Atlantic steamer fitted with turbines is said to consume only 1·3 lb. per I.H.P. per hour, excluding auxiliary machinery. H.M.'s ships Amethyst and Dreadnought have on quarterly trials shown the same advantage as on their contractor's trials, when the latter, at full power, consumed about 20 per cent. less coal per unit of power per hour than the average for the battleships of the King Edward VII. class, and the Amethyst showed corresponding superiority over sister ships with reciprocating engines.

Turbines and low speed.

There is, however, the inherent difficulty that the economy of the Parsons turbine lessens with reduced speed, and its advantage over the reciprocating engine vanishes as the speed of rotation falls below 40 per cent. of the maximum. In warship service a great range of speed is desirable, and much steaming is done at about one-fifth of

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the full power. To ensure economy at this low speed additional turbines of low power are fitted, so that satisfactory results may be attained when the ship is running at comparatively low speeds. These have no counterpart in turbine installations in the merchant service, where ships steam always at their full speed; thus the weight and area occupied by turbines in warships are greater than those needed with fast merchant vessels. But even with these cruising turbines uniformly high economy has not been attained. Economy in the Navy, although desirable, is not the most important feature. In the merchant ship the dominant consideration is to make a ton of coal do the maximum duty. When we say that 100 tons of cargo is carried a mile for 4 lb. of fuel in the large merchant ships of to-day as compared with 10 lb. in the ships of a decade ago, we have summed up the case for the merchant service.

Weight *versus* fuel economy.

In the Navy the most important point is to reduce weight; the saving of money by burning less coal is secondary. It is true that a lower consumption per unit of power means a less weight of coal for a given radius of action, but such economy may be dearly bought from the point of view of displacement, which must be the standard. If a 10 per cent. increase of weight in the boiler room, or in the engine-room, is involved in attaining a 5 per cent. reduction in weight in the coal bunker for a given radius of action, the net result is unsatisfactory. Conversely, if the application of turbines reduces the machinery weights by 20 per cent. at the expense of a slightly higher coal consumption at low powers only, it is possible to augment the fighting qualities of the ship. The increase in coal consumption at low powers, moreover, will probably not be felt in war, as the chances are that the speed of all strategic, and certainly of all tactical, movement will be high enough to enable the turbines to be at least as economical as the reciprocating engines. Thus the probabilities are that in war service a given quantity of coal in the bunkers will give as great a radius of action with well-designed turbines as with reciprocating engines, allowing any gain in weight due to the machinery to be applied to augment either offence or defence. Experience has enabled considerable reductions to be made in the weight of turbine machinery. There is no need to preface an analysis of the latest results by enforcing the importance of economy in weight in warships. The two latest applications constitute admirable examples for comparing the weight and space occupied by turbines and reciprocating machinery in warships. The Minotaur class of cruisers and the latest battleships have machinery of practically the same power. In the former the indicated horse-power is 27,000, in the latter the shaft horse-power is 24,500. There is thus a difference

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of 10 per cent., but this is not much more than is lost in the former engine by friction. Before comparing the steam efficiency, weight and space occupied, a brief description of the two installations must be given.

Typical reciprocating machinery.

Reciprocating engines are of the triple-expansion four-cylinder twin-screw type, having one high-pressure, one intermediate-pressure, and two low-pressure cylinders, arranged so as to reduce vibration to a minimum. The combined power of the two low-pressure cylinders is about equal to that of either the high or intermediate pressure cylinder. The high-pressure cylinder has one piston valve, the intermediates two piston valves, and the low-pressure cylinders have each one treble-ported slide-valve, all with balance pistons. The valve gear is of the usual type, with separate eccentrics for the ahead and astern positions. The cylinders are supported on the inside by cast-iron columns, to which are bolted the ahead and astern crosshead guide faces, and on the outside by turned wrought-steel columns; the bed-plates are of cast-steel. The starting platforms are in the wings. Two independent twin air pumps of the Weir type are supplied for each set of propelling machinery. There are two condensers placed in the wing of the ship in each engine-room provided with suitable cross connections. The circulating water is external to the tubes, diaphragms being arranged to divide lengths of tubes into four. The boiler pressure is 275 lb., and the steam-pressure at the main engines 250 lb. per square in.

Turbine machinery.

Turbine machinery is arranged for four shafts, two in each engine-room, driven by Parsons turbines working in series. The main horse-power ahead and astern turbines are mounted on the wing shafts, and the cruising, the low-pressure ahead, and the second astern turbines on the inner shafts. The cruising turbines, when working in series with the main ahead turbines, develop a total of 10,000 shaft horse-power, but are cut out for higher powers. The separate turbines for going astern also work in series, and there is one on each of the four shafts. The boiler pressure is 235 lb. per square inch, and the maximum working pressure at the engines is 170 lb. The exhaust from the low-pressure turbines passes through large eduction pipes to the main surface condensers, of which there is one in each engine-room. The circulating water passes through the tubes of the condenser, entering at the bottom and leaving at the top. There are two independent twin air pumps of the Weir type, and two centrifugal pumps in each engine-room. An auxiliary condenser is fitted in each engine-room for dealing with the exhaust from the auxiliary engines.

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Reduction in boiler power with turbines.

Representative ships of each class were fitted with the same type of boilers, so that in a comparison the engines are practically the only variants. In entering upon such comparison some reservation is prudent, as the turbine ships have not yet been tried. The designed dimensions, however, are based on reliable precedents, so that there is the minimum of speculation in making the deductions. Past successes justify the expectation that the results aimed at will be attained. No difference need be looked for in the efficiency of the boilers, and their dimensions afford evidence of the superiority of turbine over reciprocating machinery from the standpoint of steam consumption. The piston engines require 80,000 sq. ft. of heating surface, the turbine engines only 63,000 sq. ft.; the grate area is in the proportion of 1 to 60 of heating surface in each case. At full power the turbines of the battleship seem, therefore, to require quite 20 per cent. less steam than the reciprocating engines of the Minotaur class. This, however, partly arises from the fact that at full speed reciprocating engines in warships have to be worked at much beyond their most economical power, whereas at full power the efficiency of the turbine is at its practical maximum.

Saving in weight with turbines.

This higher steam efficiency of the turbines results in a great reduction in boiler weights, the difference being 300 tons. There is a further saving of 170 tons in the main engines, shafting, and propellers. The auxiliary engines, however, are 5 tons heavier, due to the increase in the size of condensers and pumps to ensure higher vacua. Taking the whole of the machinery, we have a saving of about 470 tons as compared with reciprocating engines of the same power built for the same service. When it is remembered that the normal coal supply of these vessels is 1000 tons, it will be recognised that, were the reduction in weight in the machinery department expended in augmenting the fuel carried, any little difference there might be in coal consumption at low speeds would be more than compensated for and the radius of action of the ship greatly increased. The proportion of power to weight is, in the case of the reciprocating engine, about 11·25 H.P. per ton, and in the other 14 H.P. per ton.

Floor space.

The floor space of the turbine engine-room is 42 per cent. greater than the reciprocating engine-room, but this is counterbalanced to a large extent by a reduction in the boiler-room of the turbine-propelled ship. Combining the boiler and engine space—which is only fair, as the reduction in steam-generating plant is due to the higher efficiency of the turbines—the total excess of area against the turbine is less than 2 per cent.

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Turbines more easily protected.

The turbines offer the great advantage that they are lower in the ship. In the interests of protection, the stroke of the piston in war-ship engines has been greatly reduced as compared with merchant ship practice, in order that the top of the engine may be as little above the water-line as possible. The reciprocating engines are 5 ft. higher than any part of the turbine machinery, which is completely under the water-line, and has therefore the advantage of more effective armour protection. This materially influences the cubical contents of the machinery spaces. In turbine machinery greater area is allowed for ventilation. It often occurs that the starting platform for the engineer-in-charge is above the high-pressure turbine, whereas the cylinders of reciprocating engines are at a high level above the starting platform. Ventilation is, therefore, a simpler problem in the latter instance. In the earlier turbine ships the engine-room temperature was excessively high, but with experience this difficulty has been met in part by greater cubical volume, and in part by larger fans. But withal the area of the engine and boiler-rooms combined in the turbine ship is about 7 per cent. less than in the ship with reciprocating machinery.

Other comparisons.

The higher steam efficiency and reduction of weight attending the use of turbines are corroborated by other comparisons. In the case of the German cruiser Lubeck* the boilers and machinery, excluding the auxiliaries, weigh about 7 per cent. less than the boilers and reciprocating engines of the sister ship Hamburg—609 tons, as compared with 653 tons—but the boilers were the same, no advantage having been taken of the higher steam efficiency of turbines at full power to reduce the generating power and weight of the boilers. The turbine machinery alone weighed 271 tons, the reciprocating machinery 323 tons, equal to a saving of 16·5 per cent. Dr. Elgar, F.R.S., in the James Forrest Lecture, at the Institution of Civil Engineers, stated that in the fast Egyptian steamers, Heliopolis and Cairo, of 12,000 tons gross register and 18,000 H.P., the weight of engines, boilers, and auxiliaries worked out at about 400 tons lighter for turbines than would have been the case with reciprocating machinery, notwithstanding ample margin of boiler power. The space occupied by boilers and machinery in each system was the same. The Carmania turbine machinery weighed fully 5 per cent. less than that of the Caronia, a sister ship, although the designers of these early Atlantic liners advisedly adopted a policy of caution.

High vacua and cost in weight.

The gain in weight would be greater but for the effort to obtain high vacua. If a 28-in. vacuum is maintained the economy is about

* See *Engineering*, Volume LXXXIII., page 252.

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5 per cent. greater than with a 27-in. vacuum. Various systems are adopted, with a view of drawing off the residual air in the condenser to a greater extent than in reciprocating machinery, in order to ensure more rapid condensation. The Chief of the Bureau of Steam Engineering in the United States Navy, in his latest Report (p. 24), very properly raises the question as to how far it is well to go in this direction, "the cost of the vacuum in weight and complexity of machinery increasing rapidly after 28-in. are reached. The weight of coal saved may be less than the weight of machinery added. The increased complexity of the condensing plant may counterbalance the greater efficiency of the turbine main engines." Such considerations are probably lost sight of in accepting simple empirical standards of comparison such as coal consumption.

Advantages of turbines for destroyers.

In destroyers the weights of the turbine and reciprocating machinery do not differ much, but the limit with reciprocating engines was reached in 30-knot boats. In the design of these vessels the first consideration is speed; machinery, weight, and fuel consumption are secondary. With reciprocating engines running at 400 revolutions per minute, it was, as one engineer put it, a "case of pouring in oil and trusting to God." The engineer contractor of some of the latest torpedo-boat destroyers, Mr. E. C. Carnt, of Messrs. White, of Cowes, has put it well.* "With reciprocating engines having the weights cut down to a minimum most careful inspection is required to ensure that the piston and connecting rods, bolts and the like are sound. On rough turning small markings can be detected in these by the experienced eye, which indicate not perfectly satisfactory metal. The finishing tool will, however, cover up faults one would like to have seen, and consequently on trial one is always asking oneself the question, 'Have I found all the bad ones?' and a failure at full speed means the loss of all in the engine-room. With the turbine, on the other hand, there is absolute peace of mind. The men, indeed, complain that in long trials they cannot keep awake, as they have nothing to do."

Wear and tear.

And here one naturally turns to the question of wear and tear. Few ships have yet run sufficiently long to allow a definite opinion to be expressed; but there is every promise of completely satisfactory results. The Amethyst turbines, when opened up for inspection after two years' commission, showed no signs of wear. Through the courtesy of the marine superintendent of one of the companies conducting a cross-Channel service, it is possible to make a direct comparison of the cost of repairs of turbine and reciprocating engines in vessels engaged in the same service. It is not

* At the Conference of the Institution of Civil Engineers, June, 1907.

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considered desirable to give names. The tonnage of the turbine steamer—one of Denny's build—is 27 per cent. greater, and the number of passengers carried 64 per cent. higher, than in the case of the steamer with compound diagonal engines, while the speed is 22 knots against 17 knots. The labour cost of making repairs in a season was for the turbines £176, and for the main engines in the paddle steamer £273, including, in both cases, the cost of opening out the machinery for Board of Trade surveys. These sums do not include the cost of material, in respect of which the result is equally favourable to the turbines. The only renewal in three years in the turbines was one set of glands, costing about £90, whereas in paddle steamers renewal of piston packing rings, brasses or bushes, or some such detail, has been required every quarter. It is true the paddle steamers are older by four or five years; but the comparison of labour cost is made for a year, during which the turbine steamer made 520 trips against a paddle steamer which made 288 trips. Thus the turbine has clearly a most distinct advantage over ordinary engines in respect to wear and tear. In the same period the coal consumption was 24 per cent. in favour of the turbine vessel.

Causes of accidents and their avoidance.

The repair bill for turbines in some other ships has been increased by the accidental stripping of the blades, but cases of stripping are now very rare, the causes having been investigated and overcome. Thus distortion of casings has been prevented by heavier strengthening ribs on the outer walls and by more symmetrical design. Whipping of the rotor has been guarded against by more perfect balancing. An improved system of fixing the blades has been adopted. Formerly the blades were caulked singly into grooves on the rotor and casing with distance wedges between. Later the blades were inserted in a band forming a segmental part of the ring of blades for rotor or casing, the bottom edge of the blade being, with this object, stamped to a convenient form. This system was adopted exclusively in the Mauretania by the Wallsend Slipway and Engineering Company, as a result of tests, and partly in the Lusitania by Messrs. John Brown & Co. In land practice this arrangement, identified with the firm of Messrs. Willans & Robinson, Ltd., was associated also with the shrouding of the tips of the blades. Now, however, the more favoured practice, as introduced by the Hon. Chas. A. Parsons, consists in stringing the blades and their distance pieces on a wire through holes near the root. Thus complete segments are formed and inserted bodily in the grooves of the rotor and casings. The rotor grooves are serrated or tooth-edged, the better to secure the blading when the segments are finally caulked into place. The

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upper parts of the blades in the ring are laced together as in the earlier practice by a narrow strip soldered into indents on the side of each blade. The tips are now cut away like the cutting end of a gouge, so that they have a minimum of edge surface to come into contact with the walls of the casing or the drum in the event of an accidental displacement of the rotor, which is, however, now extremely improbable in actual working.

Cost of manufacture.

This system has further cheapened manufacture. It is difficult to arrive at an accurate comparison of costs owing to variations in commercial conditions, but the turbine is slightly cheaper per unit of power than the reciprocating engine, and the higher the speed the greater the difference in favour of the turbine. With more experience in manufacture this saving will be increased. According to tenders submitted to the Admiralty the latest turbine machinery, including boilers, etc., works out to a cost of about ten guineas per shaft horse-power, or quite 10s. less than corresponding reciprocating machinery.

Astern turbines.

Experience has greatly lessened the objection formerly taken owing to the non-reversibility of the turbine. In some of the earlier ships the astern turbines were perhaps of insufficient power, but now they are, as a rule, larger, and take the full volume of steam that the boilers give, developing a power equal to 60 per cent., and in some cases 70 per cent., of the maximum of the go-ahead turbines. Unfortunately, however, this proportion does not apply when some of the boilers are not alight. At cruising speeds the power which may be developed by the astern turbines is considerably less than half of the then available ahead power; but in the turbine the power to stop or to reverse the direction of the ship is more effective than in the case of reciprocating engines, because the reversing turbine at the beginning of its work is revolving against the contrary flow of steam, and the effective steam pressure on its blades is very considerably greater than when running normally, and thus the stopping or brake power is very much greater than otherwise would be the case. Indeed, this stopping or brake power immediately after reversing may be from 40 per cent. to 60 per cent. higher than the normal astern going power, and it is at the moment of reversing that the greatest brake power is needed. No collisions have occurred owing to the deficient astern power of turbines; vessels with the turbine machinery running at 10 knots have been brought up in from 1 to 1½ times their length, and at 19 or 20 knots from 2 to 2½ times their length.* The German naval authorities have conducted trials with two cruisers differing only in their machinery—the twin

* See "Transactions," Institution of Naval Architects, Vol. XLIX., p. 272.

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screw vessel Hamburg, with reciprocating engines, and the quadruple-screw vessel Lubeck with turbine engines. These ships are 341ft. long. In the turbine ship trials were made with various propellers. The results, so far as reversing was concerned, were best with one single and one large propeller on each shaft. At five knots the turbine vessel stopped in 170 ft. from the giving of the order to reverse, and the Hamburg in 183 ft.; at nine knots the distances were 413 ft. and 360 ft. respectively; and at 11 knots 636 ft. and 590 ft. respectively. Thus at low speeds the turbine driven vessel was almost, although not quite, as satisfactory as the reciprocating engined ship. At 22 knots the reciprocating engine had the advantage, stopping the Hamburg in 918 ft. as compared with from 1430 ft. to 1758 ft. for the different systems of propellers in the case of the turbine ship.* The form of the screw propeller, of course, influences the results. Turbine-driven vessels have steamed astern at from 60 per cent. to 70 per cent. of their full-speed ahead. The form of stern affects their speed astern. Another important factor is the time in which the direction of rotation of the shaft can be changed; it has been done in turbine-steamers within twelve seconds of the giving of the order from the bridge.

Turning circle of turbine ships.

Of greater importance in manœuvring is the turning circle of the ship, and lately there has been considerable increase in the area of rudder fitted, and consequently a reduction in the turning circle of the ships. The diameter of the turning circle has in some instances been reduced to two and a half times the length of the ship, and, except in very restricted harbours it would seem to be much easier to avoid collision by giving the ship helm, while maintaining the speed, than by reversing the engines.

Speed in heavy weather.

The idea has got abroad that in heavy seas the turbine ship loses speed to a greater extent than the vessel having reciprocating engines; this, however, is not borne out by experience. In the Channel Service the turbine vessels steam better in heavy weather than the vessels with piston engines; in the former the propellers are more deeply immersed because of their less diameter, and there is less tendency to race. Being lower in the ship turbine-driven propellers are not so liable to emerge in a heavy seaway as screws driven by reciprocating engines, and even then the propeller is not sufficiently long out of the water to get time to accelerate the speed of the turbine to any appreciable extent. In any case, racing does not involve nearly the same danger as with reciprocating engines, where the possibilities of breakdown are great.

* See *Engineering*, Vol. LXXXIII., p. 252.

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Thus engineers of turbine ships do not slacken speed in a heavy sea, unless when ordered to do so from the bridge from reasons of navigation, whereas in reciprocating engines this reduction in speed is almost a necessity where there is a tendency to race. This specially applies in the case of torpedo-boat destroyers and small cruisers. Mr. Parsons, in his paper read at the Institution of Naval Architects' Congress at Bordeaux, said: "As regards turbine battleships, the reported performance of the only existing example, the Dreadnought, points to the absence of any difficulty or abnormal loss of speed in bad weather."

Parsons and Curtis turbines compared.

The Curtis system is the only one other than that of the Hon. Chas. A. Parsons applied to any extent, and its distinctive features should therefore be described. The Parsons engine is a reaction turbine; the Curtis an impulse turbine. In the former the conversion of the available energy of the steam into work takes place in passing through an annular chamber between a revolving drum or rotor and an outer cylindrical casing. Into this annular space rings of blades project both from the casing and from the drum, alternating with, and overlapping, each other. The former are known as fixed or guide blades, the latter as moving blades. The distinguishing feature of the so-called "reaction" type of turbine, of which the Parsons is an example, is that the expansion of the steam occurs not only in the fixed blades, but also in the moving blades; whereas in the "impulse" type, of which the Curtis turbine constitutes a pattern, the steam expands only when it passes through the fixed blades, and not in passing through the moving blades. The steam issuing from the guide blades of the Parsons turbine, at a velocity which ranges from about 220 ft. per second up to 700 ft. per second or more, strikes the moving blades, and "blows" them round by the "impulse" imparted. But at the same time as the steam flows through these moving blades it falls in pressure and expands; its velocity is consequently increased, and there is thus a "reaction" on the discharge from each ring of moving blades. In turbines of the Curtis type there is no such "reaction," and the motion is imparted to the rotating portion wholly by "impulse."

Theoretical advantage of Curtis system.

At full load, and for turbines of large size, the Parsons system has undoubted advantages, but when it is desired to reduce the ship's speed there is nothing corresponding to the adoption of earlier cut-off in the piston engine. The only alternative is to reduce the pressure of the steam by throttling it, and in this way some of the advantage of the expansive property of high-pressure steam—and, therefore, some measure of economy—is forfeited. The Curtis

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turbine* has, perhaps, some advantages in this respect. The change from kinetic energy to work is achieved by the "impulse" due to jets of steam acting upon blades formed on "wheels" mounted on the shaft to be rotated. The steam expands in a number of sets of nozzles or pressure "stages" successively from the high pressure to the exhaust end of the turbine. Thus, after expanding in the nozzles of the first "stage," the steam issues in jets against the first row of buckets on the rotating wheel, a large part of the energy being absorbed. It then flows to a row of stationary vanes which guide the steam into a second row of moving buckets. These may be followed by a second set of fixed vanes and a third set of moving ones, after which the steam leaves the "stage," as it is called, through a second set of nozzles, where further expansion takes place, again generating velocity. From these nozzles it flows once more in sinuous fashion through successive sets of moving and fixed blades, and thence to other "stages." The important point to note is that expansion of the steam takes place only in the nozzles, and not in either the fixed or moving blades. Hence the pressure of the steam does not alter between one set of nozzles and the next. As the steam expands from "stage" to "stage" the vanes in the low-pressure "stages" must be longer than in the high-pressure "stages," but the difference in length is less than it otherwise would be, as it is not necessary to feed the steam on to the moving blades throughout the whole circumference of the wheel. At the low-pressure end the nozzles cover the whole periphery of the wheel, but at the high-pressure end they extend only over an arc often not more than one-eighth of the whole circumference. It is thus possible to reduce the power of the turbine by cutting out a proportion of the total number of the nozzles, instead of by reducing the pressure of the steam supplied by throttling it at the valve. Thus, whereas in the Parsons system cruising turbines are fitted to attain reasonable economy at low speeds, they are unnecessary with the Curtis system. There is, however, so far, little experience with the Curtis marine turbine, and it remains to be seen whether its facilities in reducing power are not counterbalanced by other features.

Combinations of engines.

A combined system of Curtis turbines for high-pressure steam and Parsons turbines for low-pressure steam, has been suggested, because, as already described, the number of nozzles supplying steam in the former may be varied to suit the weight of steam required for a given rate of revolution and power, and because the Parsons engine is pre-eminently economical at low pressures. Another plan involves

* See "Journal" of the American Society of Naval Engineers, Vol. XIX., page 73.

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a combination of reciprocating engines for high pressure steam, with Parsons turbines for low pressure steam. This latter arrangement was tried in the torpedo-boat destroyer Velox; the piston engine was used for low or cruising speeds exhausting into the turbines, and was disconnected from the shaft at high speeds when the turbines alone propelled the ship. The economy at 11¼ knots was exceptionally satisfactory, but the reciprocating engine did not prove sufficiently elastic for the conditions of service, and when the practice of cruising at higher speeds, at 15 knots and over, was adopted, the piston engine was removed. For such cruising speeds the turbine should be as economical as the reciprocating engine. For this and other reasons the combination of the reciprocating and turbine engines is not preferred for naval work. The weight and space occupied would be increased, the tendency to breakdown would be augmented, vibration might be greater, the engine-room staff would be more numerous, more spare gear would have to be carried, steam pipes and connections would be more complicated, and separate leads would require to be taken to the turbine as well as to the reciprocating engines, so that they might work independently in the event of either breaking down. Moreover, there would be difficulty in dividing the engine-room into separate compartments.

Advantages for low-speed merchant ships.

The principle, however, offers great advantages for ships of less than 18 knots speed, and thus applies to the merchant service. Three applications are now in process of construction. Messrs. Harland & Wolff, Limited, of Belfast, in combination with Messrs. John Brown & Co., Limited, of Clydebank, are fitting turbines into a large intermediate Atlantic steamer. In this case triple expansion engines will drive the wing shafts and propellers, and will exhaust into a low-pressure turbine on the centre shaft. A corresponding arrangement is being constructed by Messrs. Denny, of Dumbarton. The third installation is that being made by the Parsons Company, and in this case the turbines will be on the wing shafts and the reciprocating engines in the centre, to suit existing conditions in the vessel to be re-engined. The object in all cases is the same—to utilise low-pressure steam more effectively than the piston engine is capable of doing. Normally the pressure of the steam at exhaust from a piston engine is not less than 7 lb. absolute per square inch, and in turbines this can be usefully employed down to about 1½ lb., which corresponds to a vacuum of 27 in., or even more. This would add about 10 per cent. to the power. Already there are in use in land stations low-pressure turbines which take the exhaust steam from rolling mill engines, mine winding engines, steam hammers, etc., working intermittently. In one case the turbine gets sufficient steam at about

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11 lb. pressure to develop about 700 B.H.P. for driving electric generators of 400 kilowatts capacity. There are several points in connection with the application of the system on ships which experience must determine. With reciprocating engines it is practically impossible to ensure that no oil will be carried over by the steam, and its presence in existing installations of reciprocating engines has resulted in the material of the condenser- and boiler-tubes deteriorating. The same result might occur to the blades of the turbines. The trouble is perhaps accentuated in some measure by the presence of salt water in the boiler feed, but in any case it is intended in at least one of the combined installations to fit a valve for disconnecting the turbine, to enable it to be opened out at sea for cleaning.

Marine gas engines.

Another possible development which is now the subject of careful experiment is the application of the internal combustion engine for marine purposes. Satisfactory results have been got with oil and gas engines in land stations. In gas engines single cylinders have developed up to 2000 H.P., although not always without difficulty; but with cylinders of 500 and even 1000 H.P. practical success has been achieved. The Admiralty have in course of construction two installations of gas engines of 500 H.P. with gas-producers, and these when built will be thoroughly tested. They will not, however, be the first marine gas engines tried in this country, as Mr. William Beardmore, of Glasgow, and others have done much to solve some of the difficulties. There are several small applications in this country and on the Continent, and many engineers are working at the problem, including the Vickers Company, who, it is understood, are approaching success on novel lines. The advantages claimed include a saving of 40 per cent. in fuel, of 33 per cent. in space occupied, and of 25 per cent. in weight. Although, owing to the adoption of numerous cylinders, the engines may be heavier than steam motors for the same power, the gas-producer will be much lighter than boilers, and will obviate the use of funnels and other obstructions to the training of guns. Smoke will also be entirely dispensed with.* There are mechanical difficulties to be met, but the advantages offer incentives to workers to overcome these difficulties, and in a year we shall know more about the possibilities.

Marine gas turbines.

The gas turbine has also proved seductive to experimental engineers: the inherent disadvantages are considerable. The temperature of the gas would probably involve rapid deterioration of the blades or nozzles. The proportion of heat exhausted would be high. The speed of the vapour due to the explosion would be abnormally

* See "Transactions" of the Institution of Naval Architects, Vol. XLIX., p. 2.

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rapid, so that the blade speed would be too great for the propellers. The compression difficulties are serious. The system, however, is a scientific probability of the future, although, perhaps, not a practical possibility of the present.

Marine oil engines.

The oil engine offers greater advantages, as here the problems are not complicated by the gas producer. There is, too, considerable experience in the use of oil engines at sea. The difficulties of oil supply are however obstacles to development. The petrol and oil motor in vedette boats has given more than promise of mechanical success. Messrs. Yarrow got 25 knots with a 60 ft. torpedo boat, which with steam engines would have given only 20 knots, the petrol motor being 50 per cent. lighter than steam machinery. Petrol, however, is highly explosive, and the maintenance of the supply is more uncertain even than with heavier oils. One or two oil engines have been fitted on board warships for driving electric dynamos, but the mechanical features have not always been commendable. The most pronounced successes are those got with engines built for submarine boats by the Vickers Company; some of these engines having developed 650 H.P. and 700 H.P. at 400 revolutions per minute. The oil consumption on service has been reduced from 1 lb. per B.H.P. per hour in the earlier boats to 0·6 lb. in the later boats. There is certainty of development in oil machinery for larger ships, and there is immediate prospect of engines of the class being adopted in torpedo craft. Messrs. Thornycroft and one or two other firms have fitted oil engines to small boats.

Oil fuel.

Oil, however, has proved more serviceable as fuel for steam boilers. Later destroyers could not possibly have achieved their speed of 33 knots and 34 knots without its aid. Many are inclined to think that the application of liquid fuel is new, whereas it was used about forty years ago on the Caspian Sea and about twenty years ago on British-built ships. The Wallsend Slipway and Engineering Company have fitted nearly one hundred ships during this period, and have probably done more than others towards the perfection of the system. The difficulty first experienced was the spraying of the oil as a vapour into the furnace. When steam was used there was a great loss of fresh water, involving large evaporators and distillers. Compressed air was next adopted, but here, again, considerable power was expended in compressing the air. By a long series of experiments a system was evolved whereby the oil itself was heated and compressed, and thus no steam or air was required at the nozzles. Forced draught, steadily maintained, completes the success. The pressure and temperature of the oil varies with the draught.

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With $\frac{7}{8}$ in. of air pressure in the stokehold, for instance, the temperature of oil on one trial on a merchant steamer was 150° Fahr., the oil pressure 140 lb., and the quantity of oil consumed per burner per hour 480 lb. With $1\frac{1}{8}$ in. pressure the temperature of oil was reduced to 110° Fahr., and, with the same oil pressure, the oil consumption per burner was increased to 610 lb. per hour. Generating steam at 140 lb., this latter rate of combustion gave an evaporation of 14 lb. of water from and at 212° Fahr. per lb. of Texas oil, as against 9·31 lb. with Welsh coal. At the slower rate of combustion—480 lb.—the evaporation was 16 lb. per lb. of oil. As a rule the economy is from 40 per cent. to 50 per cent. higher than with coal. In practice, long voyages have been made with an oil consumption of 0·9 lb. per I.H.P. per hour.

Advantages of oil fuel.

The Admiralty have made modifications to suit the service, but in view of the great success alike in evaporation and in the absence of smoke, it is thought advisable, in the interests of the Navy, that the details of construction should not be disclosed. In the earlier destroyers it was found impossible to run at full speed for more than four hours with coal fires, as they had then to be cleaned, and the speed of the boats consequently dropped instantly. Now the boilers never get dirty. The fire doors being always closed, there is no damage done by draughts of cold air. Stoking is simple, and the number of men required is less. But, best of all, the boilers can be forced to a greater extent, and can be run for longer periods. Few of the 30-knot boats could get their power with less than 2·2 lb. of coal per I.H.P. per hour, but, with the oil system, the power is got with about 1·4 lb. per I.H.P. per hour, a result which for such craft is most satisfactory. All our large warships are fitted with the system, although coal is still carried. In war time the oil would be retained for emergency use. After long steaming the coal available is in bunkers at a considerable distance from the stokehold; then the oil would be utilisable without any handling. Moreover, when the boilers are dirty, steam can easily be maintained with oil fuel, and thus the system economises weight and offers great tactical advantages.

Improved conditions in naval machinery.

Many other evidences of improved conditions in the engineering branch of the Navy might be referred to. There are fewer breakdowns of existing reciprocating machinery, and those recorded are more or less trivial, being mostly due to heated bearings. The adoption of forced lubrication for main bearings has been most beneficial, but it would involve too great a cost to apply the system in all existing ships. Boiler defects are practically at an end, and it must be confessed that the much maligned Belleville boilers continue to do satisfactory duty.

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The Engineer-in-Chief.

In conclusion, a word ought to be said about the retirement during the past year of Sir John Durston, K.C.B., from the post of Engineer-in-Chief. He did great service in the advance of naval engineering, often against opposition not always well-informed. Engineer Vice-Admiral Henry J. Oram, C.B., has succeeded him. As Deputy-Engineer-in-Chief he was a most active agent in the progressive policy which has been such a great factor in recent developments.

ALEX. RICHARDSON.

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CHAPTER VII.

The Personnel of the French Navy.

Recent events and impending changes.

Many circumstances contributed to bring the *personnel* of the French Navy under notice within the past year. Disaster followed disaster, and some incidents occurred of the utmost gravity, which spread a sense of alarm, and a consciousness that all was not well with the discipline of the French Fleet. It was seen also that the training of officers, their courses at the Superior Naval School, and the relations existing between the several branches of the Service left a great deal to desire. The French have had to deplore most of all the terrible disaster by which the Iéna was destroyed in the dockyard at Toulon, whereby dismay and discouragement were spread. Foul play was suspected, and, though evidence is wanting of the fact, there is still a possibility that malevolence was the cause of the calamity. The armoured cruiser Chanzy and the Jean Bart have been lost, and there have been accidents in the Chamois, Kabyle, and some destroyers and torpedo boats, as well as alarming fires in the arsenal at Toulon. It is remembered also that two officers have been convicted of crime, while an inquiry into a fire on board the Calédonien revealed the fact that disaffection existed among the men. This series of misfortunes profoundly impressed the French public, the Ministry of Marine, and the Chambers, causing long discussions, and projects have been formed for changing the conditions of service, with the object of providing a remedy for evils which it is admitted exist.

Discipline of the men impaired.

There can be no doubt that the measures adopted by M. Pelletan, the Socialist Minister of Marine in 1903, struck at the very roots of discipline, both in the Fleet and in the establishments on shore. The traditions and ancient customs of the Navy were ruthlessly destroyed, the families which had given their sons to the Service were discouraged, Socialist influences were intruded into the Fleet, and the unity of the corps of officers was affected thereby. The very names given to the new ships were the mark and indication of the change. Instead of being those which were glorious in the annals in the French Navy, the names were selected of philosophers, thinkers and poets, whose writings embodied the ideals of the social revolution. The men were taught the new doctrine, and ministerial decrees on the subject of disciplinary punishments deprived officers of proper means of controlling their ships' companies. Many officers in

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command of ships and squadrons pointed out the doubtful legality of rules which were at variance with the prescriptions of the naval code.

Reduced authority of officers.

Vice-Admiral Caillard, when he was Commander-in-Chief of the Northern Squadron, in 1904, protested energetically against the inadequacy of the means left in the hands of commanders in relation to the discipline of the men. He said that there was no agreement between the decrees of the Minister and the regulations of the naval Service. Many faults which could be severely punished under the code were but lightly repressed under the new instructions. Formerly it had been the custom to read to the men, by way of warning, the rules as to punishments which awaited the wrong-doer. This was laid down in the regulations, but under the system that was introduced this could no longer be done, because the actual punishments permitted were much lighter. During the three years that followed the conditions were very little improved, but on 23rd of April, 1907, a ministerial decree increased the stringency of the disciplinary regulations. M. Thomson did not bring in keel-hauling, or any severity of bygone days, but he re-introduced what may be called the black list, upon which men's names are inscribed as a disgrace and warning. The same decree made it possible for commanders to punish men by cells, deprivation of leave, and in bad cases close confinement and placing in irons. M. Pelletan had given an instruction that in no circumstances should the men be deprived of their portion of wine, on the ground that to do this would be damaging to health, but henceforth there will be no such leniency, and wrong-doers who like their wine, as well as their suppers, will have to behave better. By these and other measures the bonds of discipline have recently been strengthened, and it is hoped that no foul practice will be found henceforth on board French warships which will endanger either them or their companies.

The qualities of French naval officers.

In writing of the corps of officers of the French Navy, I desire to place on record a firm conviction that the French are fortunate in possessing many officers of energy, capacity, experience, efficiency, and enterprise, men of scientific training and great attainments, and students of strategy and tactics, of whom any Navy might be proud. Their quality has been shown in the capable and efficient handling of the ships on the coast of Morocco. Of the inner life of the French Service one's experience is necessarily limited; and this inexperience is a counsel of caution in dealing with many subjects which have recently been under discussion. It may be that at one end of the scale the cadets do not enter in the same favourable circumstances as our own cadets at Osborne—being, for one thing, much older—nor perhaps do they possess to the same extent physical alertness

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and vigour. In some respects their situation is likely soon to be improved. At the other end of the scale may be noted the known fact that French officers do not, save very exceptionally, attain the rank of captain or reach the flag list at the comparatively youthful age which has become common in our own Service. I well remember hearing French people at Brest, when the Atlantic Fleet visited the port in 1904, express surprise at the almost youthful appearance of Sir William May and of many of his officers, though he was not then the youngest vice-admiral on the list. The French Navy is not, of course, unaware of the disadvantage that results from the comparative seniority of the officers, and efforts have been made to effect changes in the direction of the much talked of *rajeunissement des cadres*, but, owing to the fact that, to accelerate the passing of flag officers to the retired list would greatly increase the non-effective charges at a time when the Navy Estimates are jealously scrutinised, not much has been achieved towards this desirable end.

The loss of ships of war.

Certain recent incidents have seemed to show want of proper training or right experience in some French navigating officers and captains, but here it may be remarked that no Navy—and certainly not our own—can claim immunity from the failures of individuals. In the case of the Chanzy, which was lost in the Formosa Channel, the court-martial found that Commander Mauger had been guilty of ignorance of his duties, or inexperience (*impéritie*), and by five votes to two he was condemned to be deprived of any command for three years and to pay the costs of the enquiry. The loss of the Jean Bart on the coast of Africa, near Cape Barbas, took place after the Chanzy disaster, but the court-martial assembled earlier. Its finding was the same as that in the case of the Chanzy, and the punishment was the same. If the French court-martial does not acquit an officer in such case, no lesser punishment than deprival of command for three years is allowable. It was remarked, as significant of a new spirit in the French Navy, that this was the first condemnation pronounced for the loss of a war-ship under the law of January 4th, 1858, which constitutes the code of naval jurisprudence, though more than fifty officers commanding vessels had in the meantime been acquitted by as many courts-martial.

Navigation and nautical astronomy in the French Navy.

It may be surmised that navigation and nautical astronomy have lost some of their attractions for the French Navy. The business of the sea can be learned only at sea in a practical manner, and since the introduction of steam and the great cost of keeping vessels at sea, the French ships remain longer in port than they used to do in the day of masts and yards. A writer in the *Yacht*, discussing this subject, asked where were men like the Mouchez, the Marcq-

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Saint-Hilaires, and the Fleuriais, who became admirals because of the renown they had won in perfecting the instruments and the methods of determining positions at sea? The same writer remarked that twenty years ago French officers had truly the sacred fire in these matters; now it is only in the Borda and at the Ecole d'Application that its right place is accorded to the theory and practice of navigation. Later on, other occupations on board ship, such as gunnery and torpedo, cause navigation to be neglected, and, as ships at sea are almost always within sight of the coast, it does not matter much whether the compasses are accurately compensated or the chronometers are perfectly regulated. The art of scientific navigation appears to have been left to enthusiasts, but it is not to be supposed that the failure implies any real reflection upon the officers; the fault has lain really with the system. The writer I have quoted draws attention to a miscalculation which took place in the manœuvres of 1906. The ships were steaming in line ahead, and twenty-four hours after leaving port the calculations made by the officers of the positions of two ships steaming next ahead and astern of one another would have placed them 22 miles apart. A question suggested itself to him as to what would have happened if these two ships, after some days' steaming, had had to meet at a rendezvous at sea.

New scheme for the training of officers proposed.

Such circumstances as these led M. Thomson and his immediate staff to contemplate the necessity of bringing about a change—a veritable revolution—in the training and internal organisation of the French Fleet and its services. Reports had been presented upon the system employed in other navies, and more particularly upon that of the British, Italian and United States Navies, and a comparison of many organisations adopted by various Admiralties caused the Minister to instruct the officers of his department to prepare a scheme for introducing a new system of training for the French Navy. To this organisation, as a project, he gave his approval, subject to further consideration, and the discussion of the scheme by the Superior Council of the Navy. The object was to inaugurate a reform not dissimilar in many respects from that adopted in this country under the scheme promulgated in Lord Selborne's Memorandum, and developed further when Lord Cawdor was First Lord of the Admiralty. The antagonisms which had been revealed in the French Fleet, and the effect they had had upon its cohesion and discipline, impelled the Minister to desire such a change. The various branches of the Service had had an independent existence; their origin had been different, their advancement had not been upon the same lines; they had lived apart, and the consequences were not for the good of the Service. The executive officer and the engineer had little in

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common; the naval constructor and ordnance officers were men of science and theory, and knew little of the actual conditions required afloat. M. Monis, in his report to the Senate upon the Iéna catastrophe, expressed a truth, though no doubt in language of some exaggeration. He said of the several branches of the Service, "Ayant pour excuse de s'ignorer, ils se détestent et se jalousent."

The antagonisms in the Fleet were a palpable danger. Executive officers were represented as treating the engineers with contempt. "A l'heure où nous sommes, être officier mécanicien de la Marine nationale, c'est presque une tare." The engineers bitterly resented the treatment to which they said they were subjected, and the neglect under which they suffered.

"Si, d'un côté, télémétrer à 3000 mètres des Marocains à peine visibles constitue un acte de bravoure et fait l'objet des récompenses suprêmes, faire le quart dans les machines de Toulon à Casablanca, les entretenir en bon état de fonctionnement dans des parages où on roule bord sur bord, armer à la hâte de vieux transports désemparés que les arsenaux n'ont pu réparer à temps, sont des actes normaux pour lesquels on est payé à la fin de chaque mois. Jamais une marque d'encouragement ou de satisfaction. Peinez, ingéniez-vous, soignez les appareils, faites à l'Etat des économies de matériel...faites-vous tuer même, tout cela ne sert à rien. Cela est même dangereux. On en a la preuve tous les jours. Ou en a eu une encore toute récente au Maroc. Tous les officiers du *Galilée*, sauf les mécaniciens, ont obtenu des récompenses, qu'ils soient ou non allés à terre. Tous les hommes de la compagnie de débarquement de ce bâtiment, sauf le mécanicien-torpilleur qui y était au même titre que les autres, ont obtenu soit des avancements, soit des propositions, soit des points supplémentaires. Tous les hommes du canot à vapeur, sauf le mécanicien et le chauffeur, ont été également récompensés." *

The ideas of the Minister

M. Thomson, realizing the magnitude of the evil, and as a preliminary step to the object in view, addressed a letter to the Naval Prefect at Brest, drawing his attention to the great importance of the question. He desired inquiry to be made into the facilities that existed, or that could be created at the port for instructing cadets in the handling of mechanical tools, and the construction, maintenance and working of steam and other machinery. He alluded to the increased necessity of such knowledge, owing to the multiplicity of mechanical devices on board ships of war. The Minister expressed his high sense of the importance of not diminishing, but rather increasing the seamanlike qualities of officers, but he insisted upon the necessity of widening the basis of their experience. The idea was to create at Brest a school somewhat analogous to our own establishments, the Italian school at Leghorn, or the college of the United States Navy at Annapolis, and Captain Perrin was accordingly instructed to report upon the subject. The result was that two schemes were proposed, one relating to the executive and "technical" officers and the other to administrative and accountant officers. It was designed to reorganise these bodies of officers, to

* A retired chief engineer in the *Marine Francaise, Organe de la Démocratie Maritime*, Feb. 1, 1908.

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make each homogeneous in general character, with division of functions, and to remove causes of jealousy or dissatisfaction, while conducing to the efficient working of the Service.

Common origin and training for officers.

With reference to the executive and "technical" officers, it may be remarked that executive officers, engineer officers, officers of the naval construction department, hydrographers, and ordnance officers were included. As has been said, all these were distinct in origin, character and duties. In the increase of specialisation, it was seen that their particularist tendencies would inevitably increase. The opinion of the Minister was that recent experience had caused opinion generally to demand the establishment of a new order of things, in which seamen, engineers, and ordnance officers should labour hand in hand for the common good. It seemed, therefore, that the surest means of progress in the right direction was to create community of views and of doctrine in those officers who, in the various branches, were responsible for the practical work of the Navy. It was not intended to effect an amalgamation, though many thought this might be the ultimate effect. At any rate, it was to be left to the scheme to work out its own ends. The branches were to preserve their autonomy, but it was desired that their officers should have a common training theoretically and practically, that they should pass through the same school, and that in this way a spirit of comradeship should be created between the several elements of the naval service. Thus would be realised the unanimity and cohesion which were declared to be necessary.

The intended new Naval school.

In pursuance of this scheme it was proposed to establish a single school—Ecole Polytechnique—somewhat like those established abroad, in which the cadets of all branches, other than administrative, accountant, and medical officers, should begin their training. This school would have training ships annexed to it, as well as boats and torpedo craft. The study of pure science would be rigorously excluded, because this would have been taught to the cadets in the lycées. The whole teaching would be in applied science directed to the necessities of the modern Navy, and would give a large place to study and practical work in all branches of steam and electro mechanics. The entrance examination would be a difficult one, and it was therefore thought necessary, and perhaps inevitable, to retard the entry by a year or two. Moreover, in conformity with the law of March 21st, 1905, imposing universal military service, the cadets would have to pass a whole year serving on the lower deck of men-of-war before proceeding to the Naval Polytechnic School. It was partly hoped that this year's training might give the necessary sea experience, and arrangements were proposed to devote much of the time to the

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special branches of naval work. Great objection, however, was raised to this feature of the scheme on the ground that the year passed as a bluejacket would be practically wasted, and that the cadets would begin their real professional training too late.

The scheme proposed.

The course at the Naval school would cover two years, and the cadets, after passing their year on the lower deck, would enter at about the age of twenty—with eighteen as a minimum and twenty-one as a maximum. Undoubtedly, according to our ideas, this is very late, and this part of the proposal met with strenuous opposition. After two years at the school the cadets would become *aspirants* or midshipmen, the rank of *aspirant* second class being suppressed. They would then go on board a training ship for a period of twelve months, carrying on their studies and applying their knowledge to their practical duties afloat. This course completed, the midshipmen being then about the age of twenty-three, would pass six months in undergoing courses in torpedo boats, submarine vessels, and with the rifle battalion—the latter for training in the conduct and duties of landing parties. After this they would pass examinations marking the beginning of specialisation for the various branches. There would be an examination for those who sought to enter the naval construction, hydrographic, and ordnance branches, and those who passed would complete their year afloat, afterwards joining their special corps and undergoing advanced scientific courses. Another examination at the end of the six months would enable specialisation to be made between executive and engineer officers for the Fleet. According to the scheme, which in this matter has since been modified, this specialisation would take place according to the number of vacancies in the several branches, and those who appeared at the head of the lists would choose the line they would enter. Those who became executive officers would pass six months more with the rifle battalion, being then promoted sub-lieutenants, while the engineers would undergo special courses. Provision was made for promotion from the lower deck, for men who proved their competence, to the number of one-third of the vacancies in the executive ranks, one-sixth in the case of the higher branches employed on shore, and in the case of the engineers of the Fleet, about one-third from the *aspirants* who specialised at the end of the course at the naval school, and two-thirds from among the engineer warrant officers, coming from the artificer ratings.

Advantages and objections.

When the details of the scheme were made public they led to a great deal of discussion, as was inevitable in the case of changes which promised, not merely reform, but revolution. It did not require a great endowment of imagination to foresee that considerable

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opposition would be raised in some quarters, and that, while younger officers might welcome the scheme, some of their seniors would be disposed to regard it in an unfavourable light. It was claimed, on the one hand, that, if the naval constructor, the ordnance engineer, the executive officer, and the naval engineer had the same origin and the same early training, they would become habituated to look at things from the same point of view. The constructor would have an exact notion of the realities of life on board, and of the necessities or desirable things demanded in the practical handling of men-of-war. If naval officers should make demands upon naval constructors, these latter would know why they were made and how or in what degree they could be carried out in constructional practice. The same would apply, in a large measure, to the officers who were concerned with the design, manufacture, and installation of the ordnance of ships of war. As to the naval engineers on board ship, the same considerations were kept in view as had influenced the British Admiralty in the new plan of naval education adopted in this country, and it was supposed in many quarters that the scheme might ultimately lead to amalgamation of the branches. There were, on the other hand, serious objections to the proposals. The engineers themselves did not like them. They saw in them a menace to their own prospects, and ridiculed the notion of a naval officer being a specialist in more branches than one, using precisely the same arguments as were advanced against the new system of training in the British Navy. It was said that the effect of the changes would be to produce men of theory, and not seamen, and that the youths who passed through the naval school with the object of entering the Service as executive officers might find themselves, *nolens volens*, naval engineers. It was feared that the young men would not go afloat until they were twenty-two or twenty-three, and officers remarked that, if a man did not become a seaman at twenty, he never would become one. He required a hard apprenticeship afloat, so that he should become habituated to the conditions of sea life, and if he made acquaintance with them too late, he would never acquire the sea temperament. Others again asserted that the four years lost, as they suggested they would be through the scheme, could never be recovered, especially in days when the French Navy has less sea experience than heretofore.

M. Chaumet's report.

M. Chaumet, in his report upon the Navy Estimates, asked, concerning the engineer branch, where was the necessity of changing the system of supplying officers which had given to the Navy a body of specialists whose duties had been executed with complete satisfaction? They had, he said, sufficient theoretical knowledge, united

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with practical experience, and a familiarity with their work which alone could give them a proper ascendency over their men. He added that the engineer officers who came from the Naval Polytechnic School might be *savants*, but they would never become workers. Moreover, if only one-third of the engineer officers were supplied from this source, while two-thirds came from the lower deck, instead of leading to amalgamation, differences would become still more accentuated. The engineers themselves would be separated in two camps, and the last condition would be worse than the first. The remark serves to illustrate the special conditions which exist in the French Navy under the Republican form of government, and that a state of affairs which exist in England without serious effect upon the Navy, acquires in France immense importance. This was regarded in some quarters as a fatal objection, and one naval engineer wrote that if "aristocratic England" were to be imitated, and the lower-deck spirit crushed out of the Navy, more than a change of regulations would be required; a revolution would be necessary.

Modifications demanded by the Superior Council of the Navy.

The scheme, thus outlined and discussed, was submitted to the permanent nucleus of the Superior Council of the Navy, and the general principle embodied was accepted. In the course of the discussion such objections as have been alluded to presented themselves, while at the same time it was recognised that, in view of recent events and of a strong feeling in the Fleet, some change was necessary to bring about the great object of creating a true spirit of comradeship in the ships. In October last the whole plan, thus prepared and accompanied by opinions expressed upon it, was presented to the Superior Council of the Navy, assembled in full session for deliberation upon this subject and upon the plans for the new warships. Here it may be remarked that the Council consists of the five admirals who are naval prefects at the ports, the admirals commanding-in-chief the Northern squadron and the squadron in the Mediterranean, four flag officers employed at the Admiralty, and the Chief of the General Staff. On this occasion Admiral Germinet, who had been selected for the Mediterranean command, was added to the Council, and took part in the deliberations with Admiral Touchard, who was then holding that command. The thirteen admirals thus assembled examined the whole proposal as it affected the executive and "technical" officers, with whom this chapter is mostly concerned, and also the scheme for the administrative officers and officials. In the first place, they proposed to exclude from the scheme the officers of the hydrographic branch, on the ground that executive officers, with a proper training, ought to take the place of this special independent branch, which should be allowed to die out. The Council

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also proposed to exclude entirely from the operation of the scheme the officers of the naval engineering branch. They could not see the necessity of passing engineers, concerned solely with the working and maintenance of marine engines and boilers, and whose education was already provided for, through higher scientific courses at the Naval Polytechnic School, in company with executive officers, and those who were to specialise for the naval construction and ordnance branches.

Object of the Superior Council.

It is difficult to determine exactly what was the real mind of the Superior Council upon this subject. They said that it was from the lower deck, from the warrant ranks and artisan ratings, that it was advisable to look for the supply of engineer officers. These men, they argued, would have practical charge of the machinery, and would serve under the orders of the executive officers. Inasmuch as the new school proposed to deal theoretically and practically with naval engineering, to the extent at least of giving a sufficient notion of the work and the requirements, it may be surmised that the admirals looked to strengthening the control of the executive officers over the engineer branch by equipping the former with sufficient knowledge and experience for the purpose. The naval engineer writing in the *Marine Française*, who has already been quoted, did not feel any doubt on that point. He saw in the proposed unity of origin the purpose of amalgamation, and the intention of driving the engineers out of the Navy, replacing them by *adjoints techniques*—engineer warrant officers—acting under the orders of executive officers. This arrangement he condemned as impracticable. "Et pendant ces querelles et tous les assauts des *Beati possidentes*, la machine à pilon et la turbine continueront à tourner. *E pur si muove!* a dit Galilée." Whatever may have been the precise intention of the admirals, M. Thomson, Minister of Marine, gave way upon this important point, in view of the unanimous opinion expressed by the Superior Council, and the naval engineers were excluded from the scheme. The Council also took a very strong line upon the proposal to send candidates for commissions in the Navy afloat for the year as bluejackets under the law of universal service. M. Thomson placed before the admirals the political reasons for this arrangement, and said that if it were altered, the Chambers would certainly insert the provision in the Bill. But the admirals were not convinced; they said that it would not do to retard too late the arrival of the young officer at the rank of sub-lieutenant.

These opinions of the Superior Council of the Navy must be regarded, as has been suggested, in the light of the special conditions existing in France. The hydrographers of the French Navy are a

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small body, nearly all the officers being located at Paris, employed in the Ministry of Marine, and it is reasonable to suppose that officers of the naval branch, qualified as navigators, would be able to execute the duties. In so far as the engineers of the Fleet are concerned, the inherent difficulty which arises from the necessity of promoting two-thirds of the total number through warrant rank from the artificer ratings seems to present an insuperable barrier from adopting such a system as has been introduced for the British Navy. Moreover, it appeared to the Superior Council that these practical engineers did not require extended theoretical knowledge, and that their time would be lost at the Naval Polytechnic School. They might be officers of lower rank, executing practical duties, while specialized executive officers exercised direction and control.

The conditions of the French Navy—how differing from our own.

Nothing has been said here about the proposal to organise the administrative services of the Navy at the ports, with promotion to positions at headquarters, or as administrators of the Inscription Maritime, or in other official positions, because the scheme has not taken shape. The Superior Council thought that administrators concerned with victualling and other matters might also have experience afloat, but asked first that the whole system should be reconstituted, with a hierarchy extending from the lowest grade to the highest, and a proper allocation of duties, so that officers concerned in practical administrative business at the ports or elsewhere should not be burdened with paper work, as they are at the present time.

Proposals regarding administrative officers.

The many objections raised to the new scheme of entry and training had the result of causing changes to be introduced. At one time it was thought that M. Thomson was discouraged and would abandon the project altogether. It now appears that the scheme is merely in abeyance pending some further inquiries and preparations. The proposals have been modified in accordance with the views of the admirals, and it is understood that they will be submitted to the Chambers during the course of the present year, as they apply both to the "technical" and the administrative officers. The hydrographers will presumably die out as an independent corps, and the engineer officers will not be affected, except perhaps in prospects they may have had of attaining a position of greater importance on board, owing to the engineering knowledge and experience which it is intended to give to future executive officers. The new naval school will therefore be the source of origin of executive officers, of those who qualify for the corps of naval constructors and of ordnance engineers. The intention is to abandon the old Borda at Brest, which stood in relation to the French Navy as the Britannia at Dartmouth stood to the British Service. The naval authorities

The scheme as modified and the new Naval school.

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at Brest have been instructed to report upon the best situation for the intended naval college and the manner in which it can best be equipped for the object in view. It is thought that a considerable sum of money will be required, and there is still a doubt as to whether the scheme may be further modified. If this should be the case, those who have advocated it so strenuously appear to be disposed to think that it would be better to abandon it altogether. At the time of writing the proposals are being prepared for submission to the legislature.

The Superior School of the Navy. Its object and system.

Another matter which has caused much discussion in France is the organisation of the Superior School of the Navy. This institution was originally proposed as a means of giving higher training in special subjects to promising officers who might qualify through its courses for the duties of command. It has nothing in common with the Royal Naval War College in this country, and it has proved in many ways disappointing. At one time the officers selected for the Superior School were embarked together in a cruiser, with professors on board, but it was soon discovered that the particular atmosphere and conditions did not conduce to reading and exhaustive study. Accordingly the school was installed at Paris. Its students are lieutenants, and no officer of higher rank can, under existing regulations, take advantage of its courses. The Promotion Committee prepares each November a list of candidates for the school, examines them, discusses their suitability, and takes account of the reports that have been made upon them. Some twenty-five or thirty candidates are nominated, and from these the Minister makes his choice, according to the number of vacancies, which is usually from twelve to fifteen. The courses include lectures and studies upon the organisation of the Navy, strategy, tactics, foreign navies, fleets, naval bases, armies, coast defence, naval construction, machinery, electricity, torpedoes, submarines, gunnery, the theory of construction, administration, international law, naval history, political geography, meteorology, the compass, and instruments of navigation. The officers undergoing courses in these many subjects pay visits to the naval ports and the establishments of the Navy and Army, and are appointed to ships for the naval manœuvres, after which they undergo an examination and receive a diploma. They are then placed upon a special list, and admirals can select them as flag-lieutenants, while captains can have them appointed to their vessels, and sometimes the Minister selects them for the command of the smaller vessels of the Fleet.

This school is not liked in the French Navy. There is strong objection to the manner in which the candidates are selected,

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favouritism playing a large part. Officers have hesitated to present themselves as candidates, lest, being rejected, they should endanger their chances and lose the advantage of good service previously rendered. Then it has been observed that admirals do not always select their flag-lieutenants from the list of officers possessing the diplomas, nor are captains always desirous to have them among their officers. Consequently, an organisation which was designed to bring forward officers for command, has often the result of relegating them to inactivity on shore. Objection is also raised to the character of the training in its extraordinary variety. It is said that only a smattering of the many subjects can be acquired by the officers during the twelve months in which they are attached to the School. Moreover, if this kind of knowledge is necessary, how, it is asked, is it that so many captains execute their duties without possessing it, and why are officers possessing the diploma found executing ordinary duties on board ship without gaining any advantage from the courses they have passed through? So much dissatisfaction has been expressed in regard to the Superior School, and it has evidently been so well founded, that a reorganisation is likely to be brought about. It has already been decided to change the system of entry, making it no longer competitive in the ordinary sense, but a test of capacity and aptitude for higher naval studies, which will probably be set upon a different footing.

Its defects and changes to be made.

The object which has been kept in view in this chapter has been to suggest the conditions which now exist in the commissioned ranks of the French Navy. An account has been given of many things which have been, and still are, exciting the keenest interest among French officers. The French Navy is like the Navy of every other Power. Its officers have a high sense of their responsibilities, an ardent desire to secure the best results with the means in their hands, and to perfect themselves, as well as they can, in the circumstances in which they are placed, for the higher duties of their profession. The officers have passed through something like a crisis, and the difficulties in which they find themselves have not yet disappeared. But a great deal has been done, and more will be achieved. Vigilant, capable and zealous officers are guiding policy in a right direction, and we may certainly look forward to better days and larger opportunities for the officers of the friendly Navy of France.

JOHN LEYLAND.

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CHAPTER VIII.

The Second Peace Conference and Naval Interests.*

The Hague Conference of 1907: its proceedings and methods.

The Second Peace Conference met at The Hague in June, 1907, and sat for almost exactly four months. As to the general character of the proceedings, I will confine myself to quoting from the frank and acute memorial of Chien Hsün, the Chinese Minister to the Netherlands, translated in the *Times* of February 20th, 1908:—

> "The twenty-six nations represented at the former Conference were increased on this occasion to forty-five. In most cases the leading representatives were either statesmen or lawyers, with naval or military experts to assist them. In no case were their arguments and representations trivial in character, and each and all did his best to advance his nation's interests; but, inasmuch as nations differ in status and power, proposals made by one nation would not commend themselves to another, and heated arguments would follow, moving the whole assembly to excitement, each representative insisting on his nation's sovereign rights and declining to submit to coercion, with the result that the proposals would be dropped half-way or suspended in a void of empty theories. This exhibits the difficulty of arriving at unanimity or securing harmonious discussion."

One is also tempted to wonder whether the Persian delegates did not repeat softly to themselves a certain couplet of the Masnavī of Jalālu 'ddīn Rūmī, a book all but sacred in the Moslem world of letters, which may be roughly Englished thus:—

> "Deeming and seeming are kings and their fame's increase,
> Deeming and seeming their motions of war and peace." †

It may be useful to explain that the subjects before the Conference were distributed among general Committees or "Commissions." After a preliminary debate the proposals made on each subject were referred to a sub-committee, which reported to its proper Commission; the Commission in turn laid its finished project, or its reasons for not having produced one, before the Conference as a whole. The delegates were in many cases in frequent communication with their Governments, but, as a rule, were not authorised to express any final or binding opinion. Votes, however, were taken by the usual process of division at every stage of the proceedings, and afforded

* Sir E. Grey's despatch conveying instructions to the British delegates, and Sir E. Fry's report on the work of the Conference just before its close, are reprinted at large in Part IV. of the present volume.

† Or in German, almost word for word:—

> "Wahn und Traum sind Menschen-Ruhm und Sieg,
> Wahn und Traum sind Menschen-Fried' und Krieg."

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valuable indications of the policy likely to be finally pursued or approved by the respective Powers. Detailed rules of procedure do not seem to have been provided for, save so far as the chairmen of the general committees and sub-committees had the courage to invent them. The finished drafts of the Commissions, if and when passed by the Conference, became Conventions ready for ratification. The Conference did make rules of procedure for the sittings of the full body, which as a rule were public. Mr. Westlake's remarks in his recent article* are much to the point:—

"If a real similarity can be traced between the Conference and a legislature, the comparison, for all the proceedings below the full sittings, must be made with the old Hungarian diet, in which the Palatine, represented at the Conference by the common-sense of the body, quashed a resolution which he disliked with the formula *suffragia non numeranda sed ponderanda*. For the full sittings the comparison may be made with the Polish diet, in which each individual enjoyed a *liberum veto*, since even the final vote did not bind any State without its own consent."

Ratifications and reservations.

At the time of writing it is not possible to state exactly what will be the formal international obligations resulting from the work of the Conference; for none of the Conventions provisionally settled by the method summarily described above is binding without ratification. Several of the most important ratifications are still outstanding, and may not come in till the end of June (in one special case, as we shall see, till a year later); it is certain that some of them will be accompanied by material reservations; and it seems probable that in some cases ratification will be withheld altogether. So far France, Russia, and the United States are the only great Powers that have signed most of the Conventions. Austria-Hungary, Germany, Great Britain, Italy, Japan, and several minor States have signed only the Final Act, which commits the parties to very little beyond pious wishes. Experience has already shown, however, that whatever rules are agreed to by a majority of the Great Powers, and not made the subject of positive protest by one or more dissenting Powers, will have great moral weight even with Governments who are not bound by them. After making due allowance for the reservations already disclosed, we may judge that most of the Conventions, as they were reported to the Conference by the Commissions which had worked them out, and annexed to the Final Act, will before long be part of the established law of nations. This judgment is subject to two exceptions of great importance, and both touching naval interests. The Convention for the establishment of an International Prize Court will certainly not be ratified by Great Britain, and probably not by some other maritime Powers, until a satisfactory agreement has been arrived at as to the law which the

* "Quarterly Review," Jan. 1908, p. 228.

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new Court is to administer. An extra year (till June 30th, 1909) is allowed for the signature of this Convention; it remains to be seen whether even this extended time will suffice for setting the new Court on foot. It is understood that a special Conference is to be held in the autumn of this year. Then the Convention as to the rights and duties of neutral States during maritime war seemed so full of doubtful matter that our delegates not only made reserves, but abstained from voting on it as a whole, and "a similar attitude was adopted by certain other important maritime States." There is also doubt, but not so much, as to the Declaration against discharging explosives from balloons or the like, as will be seen farther on.

Reduction of armaments not discussed.

It must be noted that the question of reducing expenditure on armaments was not even discussed, in consequence of the decided adverse opinion of the German Government. As Sir E. Grey wrote, "the position of Germany both as a military and a naval Power is such that it is difficult to regard as serious any discussion in which she does not take part." Moreover, it is not obvious how a discussion of this subject could be fruitful unless the way had been prepared for it, and its lines fairly well marked out, by free and confidential exchange of views carried on beforehand between the Powers mainly concerned; and for this a reasonable time, which might be several months, would be required. Frank exchange of views, again, is not practicable when the parties are on those terms which the diplomatic vocabulary calls merely "correct." Mutual trust is not likely to be increased by negotiation of this kind, still less by public talk on such delicate matters, where it did not exist before. Apart from any question of what the special interest of Germany may be, it seems that the German position was not necessarily other than natural and reasonable.

Sir E. Fry, however, declared the willingness of the British Government to enter on confidential exchange and discussion of naval programmes with any Power that might be so disposed, and proposed a resolution declaring it highly desirable that the Governments should seriously resume the consideration of the problem. The Conference had no difficulty in passing this resolution by acclamation (August 17th). It costs nothing, can do no harm, and may possibly do some little good.

We now proceed to the work of the Conference,* so far as it affects naval warfare. It may be convenient in the first place to say

* The statements here made are founded partly on the text of the Conventions as given in the English Blue-book, partly on the *procès-verbaux* issued from time to time by the Conference itself, for the use of which I am indebted to my learned friend Sir Thomas Barclay.

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something of the discussions which did not lead to such agreement as to warrant the recommendation of any proposal to the Conference as a whole. For shortness' sake we shall commonly speak of the delegates merely by the names of their nations, but it will be remembered that their votes and speeches, though expressing in a general way the intentions and opinions of their Governments, had no binding force.

MARITIME CAPTURE.

Maritime capture.

One plan which could not be expected to lead to any distinct result, in view of the known divergence of opinions, was that of abolishing the right to capture an enemy's merchant shipping and private property at sea, which has been long and persistently advocated by the United States. The British Government's position was defined beforehand in Sir Edward Grey's instructions of June 12th, 1907 (pars. 18–21), and explained by our delegates in the course of the debate, which occupied the Fourth Commission of the Conference for several days in July. Immunity from capture would not tend to promote peace if the right of commercial blockade remained: "unless commercial blockade is discontinued there will be constant interference with an enemy's ships, and constant disputes as to what constitutes an effective blockade"; and a grievance about blockade would certainly lead the aggrieved belligerent to reprisals indistinguishable from the old-fashioned general capture of enemy shipping and property. The real question for this country is whether it "should agree to a proposal which would deprive the British Navy in time of war of the right of interfering with an enemy's merchant ships or property, and of the power of commercial blockade." Discussion, however, was not declined, and Great Britain was not unwilling to consider the question as part of a general arrangement if it seemed likely to lead to such a reduction of armaments as "by rendering aggression difficult would make war itself improbable." Germany, followed by Portugal, gave a qualified assent to the proposal of the United States; the qualification, however, was such as to make this assent differ little in effect from the modified dissent of our own delegation, for a preliminary understanding was desired as to the rules of blockade and contraband, both of which the United States resolution left alone. Not that the German opinion, though it thus approached ours for the immediate purpose, was founded on the same reasons. For Germany, a great military Power, with whom strength on land must be the first consideration, the immunity of her merchant shipping, now the second in the world, is far more important than freedom to attack that of possible enemies.

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Italy was already committed to abolishing the right of capture, and supported the United States without reserve. So did Brazil, but Argentina was for maintaining the right as the natural defence of a maritime State. Russia thought the question not ripe for a practical solution. France was not prepared to abolish capture, but would abolish prize-money, and would have each State insure its own subjects against the risk to their ships and cargoes (this, in the late Prof. Lorimer's view, was the only just solution). Finally, France, Great Britain, Japan, Mexico, Portugal, Russia, Spain, and others — a total of eleven — voted against the American resolution.

Austria-Hungary, Brazil, Denmark, Germany (with the material reservation above mentioned), Italy, the Netherlands, Norway, and Sweden were in favour of it, together with minor and non-maritime States making up twenty-one in all. Chile abstained from voting, and the name of Argentina does not appear in the division. Clearly the innovation is not approved by a majority in value of the maritime Powers. Various suggestions of compromise were made, but none of them came to anything. The one definite result was that incidentally the Government of Spain declared her adhesion to the Declaration of Paris of 1856. It may be useful to note that the British argument was admirably recapitulated by Sir Edward Grey in a speech delivered in the House of Commons on February 6th, 1908. Sir Henry Maine's reasons for abolishing the right of capture, published twenty years ago in his posthumous lectures on International Law, were very properly cited in the course of the discussion at The Hague; it may suffice to remark here, with all respect for that great author's opinion, that he formed it at a time when the true principles of sea power and naval strategy had become so obscured as to be almost forgotten, and that the considérations which now prevail with all the chief maritime Powers except one or two (for we have seen that the difference between ourselves and Germany was not very wide) were obviously not before him. As to the United States, it may be material to observe that since 1899 Capt. Mahan, the chief naval adviser of that Power, has been converted to the British view, and has ceased to hold that to which his own Government is officially committed. It is rather hard to see why the American proposal is warmly applauded by many of those who seek to prevent war if possible, and in any case to mitigate it. For maritime capture is the most humane instrument of naval warfare, being as a rule bloodless; and its abolition would in no way diminish occasions for war, but would rather encourage maritime States to go to war with a relatively light heart, unless a

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marked general or local preponderance of naval and military strength enabled one of them to threaten the other with invasion.

Contraband of War.

Contraband.

The debate on contraband of war took a course which bore a curious resemblance to that of the debate on capture of hostile private property, and in like manner it ended in a vote showing a considerable numerical majority in favour of the proposed innovation, but a minority so powerful as to make the vote of little practical weight. Here, however, the former parts were reversed. Great Britain, instead of the United States, was the innovator who failed to convince the other great maritime Powers. Lord Reay was left to such comfort as he might find in many compliments, even from adversaries, on his masterly presentation of the British argument. His case was, briefly, that the rules of contraband have become unworkable under the modern conditions of sea-borne commerce; that things are not as they were when ships went on a single venture to one port of discharge and their cargo could be readily verified; that nowadays the master of a ship may well know little of what he is carrying, and less of its ultimate destination; that the search of suspected vessels is difficult and troublesome; and that, adding to these considerations the constant puzzle of knowing what will be held "relative" or "conditional" contraband, the right of seizing contraband of war is an impediment to neutral commerce altogether out of proportion to any good that belligerents can derive from it. This was not mere speculative opinion, for England had recent experience of the working of the rules both as a belligerent in the South African war and as a neutral in the Russo-Japanese war. No support, however, was forthcoming from those whose support would have been most important. Germany proposed that belligerents should be required to give public notice of what they meant to treat as "absolute" and "conditional" contraband, and that the doctrine of "continuous voyage" should be abolished, but thought no larger reform practicable. When it came to voting, the minority against the British proposal consisted of five States; but four of them were France, Germany, Russia, and the United States, the fifth being Montenegro. The nominal majority vote numbered twenty-six, including Austria-Hungary, Italy, Spain, Argentina, Brazil, Chile, and Mexico. Japan did not vote. Perhaps no incident of the whole Conference showed more clearly how futile it is to confound the equality of sovereign States—which means an equal right to the justice and benefits of the law of nations—with a supposed right to

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an equal voice. Every shareholder in a company has an equal right to have the company's affairs conducted according to the articles, and an equal right to attend meetings and vote; but if a vote given for ten shares counted as much as a vote given for a thousand, the business could not be carried on. "*L'égalité juridique des États*" threatens to become as great a nuisance in the international affairs of the twentieth century as the supposed equal natural rights of individuals proved in the political speculations of the eighteenth. The term itself, as used, begs the question; for the equality so clamorously demanded by several minor States is not juridical at all, but political. No diplomatic formalism or official courtesy can disguise the absurdity of the contention that the voice of Hayti is to count for as much as that of the United States, or even that the suffrage of a small though civilized State like Montenegro, when it concurs with that of Russia, really doubles its weight.

After the paper victory and substantial defeat of Lord Reay's motion, the Commission tried (as in the case of maritime capture) to frame a new scheme by way of compromise. There seemed to be some hope of getting "conditional" contraband abolished. But time was running short, and nothing could be settled in a shape fit to be laid before the Conference. An attempt was made, on the motion of the British delegates, to procure a Convention limited in the first instance to the twenty-six States which had voted in favour of the British proposal. This, however, failed, as several delegates considered that such an undertaking was outside the scope of the Conference's work, which did not contemplate exclusive or partial agreements between groups of Powers, that they had not authority to take up any such business, and that indeed it would look disrespectful and tend to impair the dignity and efficiency of the Conference itself. It is not known to the writer whether there is any prospect of negotiations for this purpose being started on a new and independent footing. There is, of course, nothing to prevent Great Britain, or any other Power which takes the same view, from doing this.

We now come to some Conventions which passed through the committee stages and were annexed to the Final Act of the Conference, but are so far in various ways from representing any complete agreement that they cannot be regarded as having much authority.

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Neutrals in Naval War.

Neutrals.

The draft Convention on the rights and duties of neutral Powers in time of naval war was an inconclusive outcome of long discussion which disclosed great divergence of opinions. It would hardly be unfair to say that the most the delegates could agree upon was the general duty of neutrals to do their best to observe neutrality. Their specification of what the duty amounts to in particular circumstances is so hesitating and qualified that it carries one no farther than the private expositions of jurists, and sometimes not so far. It is rather interesting to read that "a neutral Government is bound to *employ the means at its disposal* to prevent the fitting out or arming of any vessel within its jurisdiction which it has reason to believe is intended to cruise, or engage in hostile operations, against a Power with which that Government is at peace" (Art. 8 of Convention). This is distinctly less exacting than the rule of "due diligence" by which Great Britain undertook to be bound at the time of the Geneva Arbitration, and which we proposed, in conjunction with the United States, to recommend to other Powers for general adoption (a pious intention which has never been executed). For the means at a Government's disposal are the means it can in fact lawfully use at the time of the acts or omissions complained of. The rule of the Treaty of Washington was in itself better, as tending to greater certainty and uniformity, provided always that a competent and impartial tribunal could be found to interpret the law.

Fate of the twenty-four hours' rule.

Great Britain endeavoured to procure the adoption of her own twenty-four hours' rule for the stay of belligerent war-ships in neutral harbours and territorial waters; but nothing more definite was agreed upon than a statement of that limit as the general rule, subject to any special legislation of the neutral Power (Art. 12). In other words, belligerents may enjoy the hospitality of a neutral port for twenty-four hours—and as much longer as the neutral pleases. Similarly as to coaling, they may have only as much coal as will take them to their own nearest port—unless the rule of their neutral host is that they may fill up their bunkers. Apparently it would be a breach of neutrality to let them carry coal on the quarter-deck. In short, the greater part of this Convention is a mere list of presumptive rules which neutral Powers (with or without moral persuasion from belligerents) may vary at their pleasure. As to formulating the right of belligerent ships to passage in neutral waters, the Bosporus, the channel of the Japanese archipelago, and, as it seemed to some, the political considerations involved, raised so many difficulties that the article on this topic disappeared from the

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draft as passed by the whole Conference. A still more novel and lax conception of neutrality appears in Art. 23, whereby "A neutral Power may allow prizes to enter its ports and roadsteads, whether under convoy or not, when they are brought there to be sequestrated pending the decision of a Prize Court. It may have the prize taken to another of its ports." Benevolent neutrality might play a good many tricks under cover of this permission. One may even think that, if Dr. Johnson could consider it, his language to the benevolent neutral might, in possible circumstances, resemble that with which he confounded the bargee.

On the whole, this Convention shows a deplorable tendency to postpone the definition and safeguarding of neutral rights to the convenience of belligerents. Whether we test it by the extent to which it would secure uniform rules of any kind, or by the assistance it would give to neutral Powers—who may often be weaker than their belligerent neighbours—in preserving an impartial attitude, it is distinctly inferior to existing British practice That practice is founded on existing general agreement as hitherto understood by English authorities, and our delegates abstained from voting, so as to leave the whole matter quite open for the consideration of our Government. We collect from Sir E. Fry's report that, if Great Britain finally declines to ratify this instrument, she will probably not be alone; in fact, there were other abstentions and reserves, but for such various reasons that they cannot be taken as supporting any one line of objection. Count Tornielli, summing up the work of the Third Commission (October 4th, 1907), gave it credit for unanimous desire to make regard for the interests of neutrals the first consideration. A chairman is bound to say something pleasant to all parties, so far as he can, and it would not be fair to take his official optimism too seriously. The text of the Convention itself is more eloquent than any criticism. Certainly many passages in the proceedings of this Conference recall the words of the Psalmist: "I labour for peace, but when I speak unto them thereof they make them ready for battle."

Submarine and Floating Mines.*

Sub-marine and floating mines.

Prominence was given to this topic by the extensive use of anchored mines, and to some extent floating mines, in the Russo-Japanese war, and the ensuing damage to neutral shipping. Such damage was due, in the opinion of the Japanese delegate who took part in the debate, wholly to anchored mines which had broken loose

* "Mines sous-marines automatiques de contact" is the official title of the subject, but floating mines are the really important part of it.

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from their moorings under the force of wind and weather. A memorandum from the Chinese delegate stated that Chinese coasting and fishing vessels had suffered much more than was generally known, and that the estimated loss of life was between five and six hundred. The Conference had before it, one would think, an extremely strong case for the drastic regulation of a method of warfare so likely to prove a dangerous nuisance to innocent third parties. In fact, England, Japan, and a few other States were prepared to take this line; but in this as in other matters the majority deemed their possible interest as belligerents of more importance than their security as neutrals, and, to use the words of Sir E. Fry's report, the discussions were protracted and resulted in only a very partial adoption of the British proposals. In vain did Sir Ernest Satow point out in a forcible speech (September 17th) that what the world expected of the Conference was not to codify the laws of war (a thing which the public neither understands nor cares for), but to diminish its occasions, or, at any rate, not increase them; and that the danger to neutral property at sea from the use of uncontrolled mines is exactly of that kind which, in the event of serious damage resulting, may make it most difficult for neutral Governments to avoid being drawn into the war. The refusal of the majority to concur in any really efficient restriction was tempered to some extent by the declaration of Baron Marschall von Bieberstein that, although Germany had voted against most of the proposals, it was not with any intention of sowing mines broadcast on the high seas, or of maintaining that whatever is not expressly forbidden is allowed. "We are agreed that a belligerent who lays down mines takes on himself a grave responsibility towards neutral and peaceful navigation." This declaration is welcome so far as it goes. As to the rules of the Convention as passed by the Conference, their subject-matter is confined to automatic contact mines, as, in fact, the debate was. Indeed, no one had ever complained, or was entitled to complain, of a belligerent Power establishing within its territorial waters fixed mine-fields controllable from observing stations on shore. Two methods of employing mines were discussed, apparently with very little technical guidance from the naval members of the Conference other than the American delegation. Anchored mines may be laid down by either a blockaded or, more usually, a blockading naval force as an obstacle to hostile attempts at entrance or exit, as the case may be. It is obvious that a weak blockading fleet may be tempted to use a cordon of mines as a cheap substitute for a proper naval blockade; though the British delegates protested against this practice being regarded as legitimate. Loose mines may be thrown

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out in a naval action from a ship in retreat before an enemy of superior strength, in order to embarrass and delay the pursuers, and some of the lesser maritime States appear to think this a valuable method of defence. The rules prescribe a time limit of one hour for the life (as we may call the active condition) of loose mines, counting from the time when they pass out of the owner's control; they forbid the use of anchored mines not so constructed as to become dead when they break loose; and they wholly forbid the use of automatic mines for the purpose of mere commercial blockade. All possible precautions are to be taken to avoid injury to neutral shipping. Neutral States employing mines for the protection of their own coasts (which seems a curious proceeding) are to use the same caution as belligerents. But the whole thing is qualified by an article which is in form an additional obligation, but is really a proviso leaving the substantial result in doubt. "The contracting Powers which do not at present own perfected mines of the pattern contemplated in the present Convention"—*i.e.*, such as to become harmless on parting from their moorings, or, if unanchored mines, an hour after being cast loose—"undertake to convert the *matériel* of their mines as soon as possible." How is any one to know when that will be? The problem is already solved by at least one Admiralty, but others may profess inability for an indefinite time. Nothing is said about the limits of space within which the use of contact mines is lawful. England endeavoured in vain to have it restricted to the territorial waters of the belligerents. The Convention is for seven years, and after that time express notice of withdrawal is required; the contracting parties engage to take up the subject again six months before the date named, unless the Third Peace Conference has already dealt with it. Altogether this Convention can only be pronounced quite inadequate. At the sitting of October 9th Sir Ernest Satow formally declared that England could accept it only as an instalment. He pronounced it insufficient from the point of view both of neutrals' rights and of humanity. Neutrals have a better title to claim that their traffic on the high seas shall not be made dangerous long after actual hostilities on the spot have ceased than belligerents have to appropriate the sea to their warlike purposes.

In contrast to the dangerous and, one fears, growing disposition—which is by no means confined to great military Powers—to favour belligerent convenience at the expense of neutral rights, it may be useful to quote Sir Edward Fry's statement of the true doctrine, as it seems to the present writer, in a paper read before the British Academy in 1906. "If we are to weigh the convenience of bel-

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ligerents against the convenience of neutrals, it would seem that the interests of the latter ought to prevail; they are more numerous generally, if not always, than the parties to the war; they are at least innocent parties, and the privileges which they assert are all comprised in the claim to be left alone in the enjoyment of their ordinary rights. If men are allowed to fight in the street, it will not be unreasonable to demand that they shall interfere as little as possible with the passage of peaceable citizens."

International Prize Court.

Prize Court.

The Convention on this subject is in a peculiar position. Its operation is not conditional on the face of it except so far as this, like all the other Conventions, will bind only those Powers who ratify it. But in this case a specially long term is allowed for ratification (till the end of June, 1909, instead of 1908), and it is well understood that some of the Great Powers will ratify the Convention only if some fairly definite agreement can be arrived at, by a special Conference for that purpose or otherwise, as to the law which the new Prize Court is to administer. As it now stands, the Court is to be guided (1) by any treaties binding on the parties before it; (2) by the rules of international law; (3) in default of any accepted rule, by the general principles of justice and equity. How will these principles appear to a tribunal whose members will be of different nations, trained in different legal systems, probably not knowing one another beforehand, and possibly not able to converse with freedom in any one language? for there are diplomatic as well as legal fictions, and the presumption that all educated men speak as well as understand French is one of them. If we follow the traditions of international law, the words of the text point to the same kind of beneficent invention that was practised by the founders of this branch of jurisprudence from Grotius onward, for about a century. This appears to be the result aimed at, and, in the opinion of M. Renault, the framer of the report from the drafting Commission to the Conference, to be expected with some confidence. But Grotius and his successors worked with a common ideal, with the common acceptance of Roman law as embodying the highest natural reason of mankind, and with a common learned language; and above all they were supported by a strong general feeling that some kind of rule was necessary, and general willingness to accept any rules that seemed fair and workable and were sanctioned by the approximately unanimous authority of learned persons. Thus what they said was reasonable had a very good chance of being

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generally thought so. Now the first of the conditions just named, and the last to a much less degree, may be said still to exist; the others do not.

M. Renault's able report says: "L'essentiel est d'avoir des magistrats qui inspirent toute confiance." Yes, and persons can be found who answer that description individually, and we agree that their collective opinion would have the greatest weight if it were unanimous or so nearly unanimous as to be really collective. But why should we expect this? The quorum of the proposed Court is nine. There are also nine judges in the Supreme Court of the United States, and these nine, having a common language, nationality, and legal habit of mind, are not unfrequently divided five to four on questions of legal policy not covered by existing authority. What sort of law of nations would be made if the judges nominated by Great Powers were equally divided and the scale turned by the opinions of others representing minor and perhaps non-maritime States? The report argues that, if we wait for the law to be defined by international compact before we set a Court to administer it, we may have to wait a lifetime. But we shall have to wait quite as long before the Powers consent to have the decisions of their Prize Courts reviewed by a tribunal of imperfectly known judges applying a wholly unknown law, and perhaps overruled by a bare majority of them.

In a year's time we may see whether the combined wisdom of the Powers can produce something like a working code of prize law. For the purposes of this Annual, at any rate, it would be idle to speculate in advance on the probable character of that code. The elaborate provisions for the constitution of the Court do not appear to have much, if any, direct bearing on any naval interest. But it may be observed that eight Powers are to name judges who will be permanent members of the Court, while the rest will exercise the right of nomination only according to a scheme of rotation spread over a cycle of six years. These eight Powers are Austria-Hungary, France, Germany, Great Britain, Italy, Japan, Russia, and the United States (Art. 15 of the Convention). We have accordingly what may be called an official list of the Great Powers to replace the old list of five that was current from the Treaty of Vienna to the formation of the Kingdom of Italy. Prussia has been merged, for most purposes of international affairs, in the German Empire; United Italy has come into being; and the addition of one American and one Asiatic Power shows that the sphere of world-politics is no longer confined to Europe and the dominions of European States. For once it seemed to the majority of the Conference that the claim

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of minor States to "equality as regards not only their independence, but their share in all international institutions" was untenable. Chile, however (together with half-a-dozen other States* whose interest in the question cannot be considered substantial), objects to this Article.

There remains a group of Conventions dealing with or affecting incidents of naval warfare on which there was no vital and, with one exception, no serious difference of opinion so far as concerns their actual contents. In part they express and confirm the opinions already held by the most esteemed writers, and understood to be prevalent—the "better opinion," as we say in the legal profession. To some extent, however, they lay down new and specific regulations, which, as conducing to certainty, will no doubt be thought useful.

Opening of Hostilities.

Notice of opening hostilities.

"The Contracting Powers recognise that hostilities between themselves must not commence without previous and explicit warning (*un avertissement préalable et non équivoque*), in the form either of a reasoned declaration of war or of an ultimatum with conditional declaration of war" (Art. 1). Very good; but what amount of previousness will do? We might be tempted to follow the general (though not invariable) rule of English law and take no account of anything less than a day, so that twenty-four hours' notice would be required. Only that requirement was in fact proposed in terms, and did not find acceptance. What it really comes to, therefore, is that sharp practice is disapproved of, but the Powers do not commit themselves to defining what will be sharp practice in particular circumstances. We are far from denying that this deliberate collective opinion will have a wholesome effect; it may well be found sufficient. The distinct requirement of express notice is new. Hitherto the law of nations has not been understood to require formal declaration of war, which, as a rule, conveyed no real warning; but, after being exceptional for some time, declaration has again become usual within the last generation or thereabouts. Another question occurs. Suppose that a naval commander remote from the seat of his Government judges it important to stop the prospective enemy's concentration of his fleet, or other preparations for securing strategic advantage, and issues a declaration of war in the name of his nation, but in fact on his own responsibility. Will ratification by his

* Cuba, Guatemala, Hayti, Persia, Salvador, Siam, Uruguay.

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Government when apprised of the facts make this a good declaration within the meaning of the Convention? On principle the answer seems to be in the affirmative; for the enemy will have had in fact the warning which the Convention requires, and the authority of the officer communicating it is a matter between his own Government and himself. We need hardly say that an officer who took any such step except in face of a clear emergency would expose both his country's interests and his own to serious risk. As a surprise opening of warfare is forbidden, the right to defend oneself against it remains unimpaired, or, if possible, is strengthened; and it would need an adventurous amateur sea-lawyer to argue that the party so attacked must let the attacker (who by the hypothesis is committing a breach of faith) actually strike the first blow. Hostilities are commenced as soon as an immediate hostile intention is manifested by some unequivocal act. Certainly no commanding officer desirous of preserving his ship or his reputation would hesitate to act accordingly, though it may be hoped that the necessity will never arise.

Merchant Ships in Enemy Ports, etc.

Merchant ships at outbreak of war.

The Convention which regulates the condition of merchant ships belonging to a belligerent Power, and lying in an enemy port at the beginning of hostilities, has little direct or necessary bearing on naval warfare, but if ever it becomes operative it may be the duty of naval officers to execute it on the high seas and in some ports. It is stated to be "desirable" to let ships in this situation depart within a reasonable time. Enemy merchant ships which left their last port before the war began, and do not know of the war when met with, are declared not to be good prize; they can only be detained during the war, or requisitioned (in case of need destroyed) on payment of compensation; and so may be a ship which is disabled, without fault of her own, from leaving an adverse belligerent's port. There does not appear to have been any binding rule heretofore, but the purport of the Convention is to confirm the more benignant opinion and practice.

Conversion of Merchant Ships into War-ships.

Conversion of merchant shipping.

This short Convention has the merit of unusual frankness. It begins by reciting that the Contracting Powers have been unable to agree whether it is allowable in time of war to convert a merchantman into a man-of-war on the high seas, and this unsettled question is accordingly left aside. Now this was the only matter of real

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importance which the Conference had to consider under the present head. Rules are then laid down as to a converted merchant ship being under the direct control of her national Government, flying the Service flag, being under a duly commissioned officer, and having a crew under Service discipline—things in which there is really nothing new. On the principal question a nominal majority for disallowing conversion from the mercantile to the naval flag on the high seas included England, Italy, Japan, and the United States; but Austria, France, Germany, and Russia take the opposite view.

Bombardment by Naval Forces.

Bombardment.

Naval bombardment of undefended places is forbidden. This puts an end to the fantastic school of naval warfare which enjoyed a fleeting fashion some twenty years ago, and imagined a cruiser squadron gathering riches if not glory by levying contributions on well-to-do coast towns like Brighton, Atlantic City, or Ostend, under threat of bombardment. It is added that a mine-field, even of automatic contact mines, is not of itself to be considered a defence for this purpose; and to this there has been some not unnatural objection. The reason is supposed to be that a mine-field is a merely passive defence, and does not threaten the enemy's fleet at sea. But what if that fleet wants to occupy the town or part of the shore for military reasons? Can the authorities of the town say, "We are undefended, but there is our mine-field; you may remove the mines at your peril: see Convention IX., Art. 1"? Would the mine-field then cease to be a *seul fait?* Warlike establishments and stores, on the other hand, may be destroyed by gun-fire whether protected by fortifications or not, if the local authorities will not themselves destroy them on being required to do so. Requisitions for provisions of which the hostile fleet is in immediate need, in reasonable proportion to the local resources, may be enforced by bombardment after summons and refusal. Bombardment of undefended places for non-payment of money contributions is specially forbidden. Further provision is made for sparing places of worship, museums, hospitals, and the like in all cases where a naval bombardment takes place (this, of course, includes the bombardment of a fortified town); such monuments, etc., are to be indicated by "large stiff rectangular panels divided diagonally into two coloured triangular portions, the upper portion black, the lower portion white." It seems understood that the wall of a building may itself be the "panel" in cases where its situation and aspect make this convenient. This device is new. Finally, "a town or place, even when taken by

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storm, may not be pillaged." We hope not; the last instances of this evil custom, in civilised warfare at any rate, were in the Peninsular War.

The Geneva Convention and Maritime Warfare.

Geneva Convention.

The Convention on the adaptation of the principles of the Geneva Convention to maritime warfare extends and defines the protection to be accorded to hospital ships, prescribes their distinctive marks, and declares that a neutral vessel does not expose itself to capture by rescuing wounded or shipwrecked belligerents with or without request. As there is nothing new in principle or affecting the conduct of naval operations to any appreciable extent, it does not seem useful to repeat the details.

Special Immunities from Maritime Capture.

Special immunities from capture.

Postal matter is exempt from capture on the high seas, unless found in a blockade-breaking ship and destined for or coming from the blockaded port. Neutral mail-ships are not exempt from search, but are to be spared as much as possible. Fishing-boats and local small craft are exempt, provided they take no part in hostilities. So are vessels engaged on works of religion, science, or charity. Enemy merchant ships' crews and officers, if personally of neutral allegiance, will not be prisoners of war (subject, as to officers, to undertaking not to serve in an enemy ship during the war). Even enemy subjects will not be prisoners of war if they undertake in writing to abstain from warlike service of every kind during the continuance of hostilities.

Discharge of Projectiles and Explosives from Balloons.

Projectiles from balloons.

This is forbidden, with additional words as to "other methods of a similar nature," which doubtless extend the prohibition to air-ships and flying machines of whatever kind. The declaration only renews the earlier one of 1899, which had expired by lapse of time; it is to be in force until the end of the Third Peace Conference, but will probably continue to be disregarded by writers of prophetic military fiction. It is true that there was considerable difference of opinion. One view strongly supported was that it was sufficient to extend the rules on bombardment to the launching of projectiles by any means whatever. France, Germany and Russia voted against the declaration, and Japan abstained from voting, on the ground that a merely

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partial agreement on such a matter was of very little use. But the history of the Conventions of 1899 tends to the conclusion that the declaration will be accepted in practice unless some of the Great Powers not only refuse to ratify it, but express positive dissent. Our delegates took this occasion to notify the adhesion of the British Government to the Declaration of 1899 against asphyxiating projectiles and expanding bullets, to which Great Britain did not assent at that time.

Further regulation will probably be required in course of time as the art of aerial navigation makes progress. It may not be extravagant, for instance, to guess that before very long our fleets may be accompanied or preceded by literally flying scouts. These would be light craft, and their primary functions not combatant; and, as their business would be to escape observation if possible, they would not want to betray themselves by dropping explosives even if they could lawfully do so. What would or might happen if hostile air-scouts fell in with one another seems to be a question outside the present declaration. If ever air-shipping is so developed as to become a practical and usual form of locomotion on a considerable scale, the whole art of war by land and sea will have to be revised; but that time, for anything that yet appears, may still be very far distant—as distant as the cessation of war itself among civilised peoples.

Other Conventions not here material.

The Conventions on the settlement of international disputes (dealing with mediation, commissions of inquiry, and improved arbitration procedure), on the limitation of forcible proceedings for the recovery of contract debts, and for the regulation of war by land, are too remotely connected with naval interests, if at all, to be included in the subject of this chapter. But the politeness with which the Powers speak of the possibility of war between any of themselves as "*cette hypothèse extrême*" must not pass without admiration; its due meed of melodious laughter could be given only by some such master of humour as George Meredith. War, nevertheless, does tend to become less probable. There has now been unbroken peace in western and central Europe for more than a generation, in spite of disputes and ambitions which, under the conditions of the eighteenth or the early nineteenth century, would have been amply capable of producing a general European war.

Neither must we attribute the slender results of the Conference, on its pacific side, at any rate, to want of individual willingness or competence. The following sentences from Sir E. Fry's despatch of October 16th, 1907, should be laid to heart by all persons interested

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in the cause of peace:—"The machinery of this Conference has proved in a high degree dilatory and confusing, the rights of individual delegates to take up the time of the Conference, the rights of a majority over a minority in the absence of unanimity, the power of a chairman to confine discussion within due limits—these and many other questions demand solution before another meeting of the Conference can prove satisfactory. The claim of many of the smaller States to equality as regards not only their independence, but their share in all international institutions, waived by most of them in the case of the Prize Court, but successfully asserted in the case of the proposed new Arbitral Court, is one which may produce great difficulties, and may perhaps drive the greater Powers to act in many cases by themselves." Perhaps the most sensible thing this Conference did was to recommend, at the end of the Final Act, that about two years before the meeting of the next Conference a special Committee should be constituted to draft agenda for preliminary consideration by the Governments of the Powers, and to frame a scheme of procedure.

FREDERICK POLLOCK.

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CHAPTER IX.

The Share of the Fleet in the Defence of the Empire.

At the close of the Great War, which ended in the downfall of Napoleon, the maritime position of the British Empire was not only predominant—it also was, and long remained, beyond the reach of challenge. After the stupendous events of the great contest such successes as those at Algiers where we were helped by the Dutch, at Navarino where we had two allies, and at Acre were regarded as matters of course and no very grave issue hung upon any one of them. For more than half a century after Nelson's death all the most brilliant achievements of British arms were performed on shore, in India or in the Crimea. There were also many small wars on land, and it may well have seemed to contemporaries that the days of great naval contests were over and that force of circumstances was converting us into a military from a naval nation. The belief in the efficacy of naval defence was not extinct, but it had ceased to operate actively. Even whilst the necessity of that form of defence was far more urgent inattention to or ignorance of its true principles had occasionally allowed it to grow weak, but the possibility of substituting something else for it had not been pressed or even suggested. To this, however, we had now come; and it was largely a consequence of the Crimean War. In that war the British Army had nobly sustained its reputation as a fighting machine. For the first time after a long interval it had met in battle European troops and had come out of the conflict more renowned for bravery than ever. Nothing seemed able to damp its heroism—not scantiness of food, not lack of clothing amidst bitter cold, not miserable quarters, not superior forces of a valiant enemy. It clung to its squalid abodes in the positions which it was ordered to hold with a tenacious fortitude that had never been surpassed in its glorious history, and that defied all assaults. In combination with its brave allies it brought to a triumphant conclusion a war of an altogether peculiar character.

The campaign in the Crimea was in reality the siege of a single fortress. All the movements of the Western invaders were undertaken to bring them within striking distance of the place, to keep them within reach of it, or to capture it. Every battle that occurred

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was fought with one of those objects. When the place fell the war ended. The one general who, in the opinion of all concerned, gained high distinction in the war was the general who had prolonged the defence of Sevastopol by the skilful use of earthworks. It was no wonder that the attack and defence of fortified places assumed large importance in the eyes of the British people. The command of the sea held by the allied Powers was so complete and all-pervading that no one stopped to think what the course of hostilities would have been without it, any more than men stop to think what the course of any particular business would be if there were no atmosphere to breathe in. Not a single allied soldier had been delayed on passage by the hostile fleet; not a single merchant vessel belonging to the Allies had been captured by a hostile cruiser. Supplies and reinforcements for the besieging armies were transported to them without escort and with as little risk of interruption as if the operations had been those of profound peace.

No sooner was the Crimean War over than another struggle took place, viz., the war of the Indian Mutiny, and that also was waged entirely on land. Here again the command of the sea was so complete that no interruption of it, even temporary, called attention to its existence. Troops and supplies were sent to India from the United Kingdom and from Hong-Kong; horses for military purposes from Australia and South Africa; and in every case without a thought of naval escort. The experience of hostilities in India seemed to confirm the experience of the Crimea. What we had just done to a great European nation was assumed to be what unfriendly European nations would wish to do and would be able to do to us. It was also assumed that the only way of frustrating their designs would be to do what had recently been done in the hope of frustrating ours, but to do it better. We must—it was said—depend on fortifications, but more perfect than those which had failed to save Sevastopol.

The protection to be afforded by our Fleet was deliberately declared to be insufficient. It might, so it was held, be absent altogether, and then there would be nothing but fortifications to stand between us and the progress of an active enemy. In the result the policy of constructing imposing passive defence-works on our coast was adopted. The fortifications had to be multiplied. Dependence on that class of defence inevitably leads to discovery after discovery that some spot open to the kind of attack feared has not been made secure. We began by fortifying the great dockyard ports —on the sea side against a hostile fleet, on the land side against hostile troops. Then it was perceived that to fortify the dockyard ports in the mother country afforded very little protection to the

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outlying portions of the Empire. So their principal ports also were given defence-works—sometimes of an elaborate character. Again, it was found that commercial ports had been left out and that they too must be fortified. When this was done spots were observed at which an enemy might effect a landing in force, to prevent which further forts or batteries must be erected. The most striking thing in all this is the complete omission to take note of the conditions involved in the command of the sea.

Evidently it had not been understood that it was that very command which alone had enabled the armies of Western Europe to proceed, not only without serious interruption, but also without encountering an attempt at obstruction, to the field in the Crimea on which their victories had been won, and that the same command would be necessary before any hostile expedition, large enough to justify the construction of the fortifications specially intended to repel it, could cross the sea and get within striking distance of our shores. It should be deeply interesting to the people of those parts of the British Empire which lie beyond sea to note that the defensive system comprised in the fortification of the coast of the United Kingdom promised no security to them in the event of war. Making all proper allowance for the superior urgency of defending the heart of the Empire, we must still admit that no system of defence is adequate which does not provide for the defence of other valuable parts of the great body politic as well.

Again the system of defence proved to be imperfect. Every part of the Empire depended for prosperity—some parts depended for existence—on practically unrestricted traffic on the ocean. This, which might be assailed at many points and on lines often thousands of miles in length, could find little or no defence in immovable fortifications. It could not be held that the existence of these released the Fleet from all duty but that of protecting our ocean commerce, because, if any enemy's Navy was able to carry out an operation of such magnitude and difficulty as a serious attack on our home territory, it would assuredly be able to carry out the work of damaging our maritime trade. Power to do the latter has always belonged to the Navy which was in a position to extend its activity persistently to the immediate neighbourhood of its opponent's coast line.

It is not to be supposed that there was no one to point this out. Several persons did so, but being mostly sailors they were not listened to. In actual practice the whole domain of imperial strategy was withdrawn from the intervention of the naval officer, as though it were something with which he could not have anything to do. Several great wars had been waged in Europe in the meantime, and

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all of them were land wars. Naval forces, if employed at all, were employed only just enough to bring out how insignificant their participation in them was. As was to have been expected, the habit of attaching importance to the naval element of imperial defence declined. The Empire, nevertheless, continued to grow. Its territory was extended; its population, notably its population of European stock, increased and its wealth and the subsequent operations of exchanging its productions for those of other countries were enormously expanded. At the same time the Navy, to the strength and efficiency of which it had to look for security, declined absolutely and still more relatively. Other Navies were advancing: some had, as it were, come into existence. At last the true conditions were discerned, and the nation, almost with one voice, demanded that the naval defences of the Empire should be put upon a proper footing.

Let no one dismiss the foregoing retrospect as merely ancient history. On the contrary, let all those who desire to see the British Empire follow the path of its natural development in tranquillity study the recent past. By doing this we shall be able to estimate aright the position of the Fleet in the defence of the Empire. We must examine the circumstances in which we are placed. For five-and-thirty years the nations of the world have practically lived under the rule of force. The incessant object of every great state has been to increase the strength of its armed forces up to the point at which the cost becomes intolerable. Countries separated from one another only by arbitrary geographical lines add regiment to regiment and gun to gun, and also devise continually fresh expedients for accelerating the work of preparing their armies to take the field. The most pacifically inclined nation must do in this respect as its neighbours do, on pain of losing its independence and being mutilated in its territory if it does not. This rivalry has spread to the sea, and fleets are increased at a rate and at a cost in money unknown to former times, even to those of war. The possession of a powerful Navy by some state which has no reason to apprehend over-sea invasion and which has no maritime interests, however intrinsically important they may be, commensurate with the strength of its fleet, may not indicate a spirit of aggression; but it at least indicates ability to become an aggressor. Consequently, for the British Fleet to fill its proper position in the defence of the Empire it must be strong. To be strong more than large numbers will be required. It must have the right, that is the best, material, the best organisation, the best discipline, the best training, the best distribution. We shall ascertain the position that it should hold if we examine what it would have to do when

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called upon for work more active than that of peace time. With the exception of India and Canada no part of the Empire is liable to serious attack that does not come over-sea. Any support that can be given to India or Canada by other parts of the Empire must be conveyed across the sea also. This at once indicates the importance of ocean lines of communication.

War is the method, adopted when less violent means of persuasion have failed, to force your enemy to comply with your demands. There are three principal ways of effecting this—invasion of his country, raids on his territory, destruction or serious damage of his sea-borne commerce. Successful invasion must compel the invaded to come to terms, or his national existence will be lost. Raids upon his territory may so distress him that he would rather concede your terms than continue the struggle. Damage to his sea-borne commerce may be carried so far that he will be ruined if he does not give in. So much for one side of the account; we have to examine the other. Against invasion, raids, or attempts at commerce-destruction there must be some form of defence, and, as a matter of historical fact, defence against each has been repeatedly successful. If we need instances we have only to peruse the history of the British Empire.

How was it that—whilst we landed invading armies in many hostile countries, seized many portions of hostile territory, and drove more than one enemy's commerce from the sea—our own country has been free from successful invasion for more than eight centuries, few portions of our territory have been taken from us even temporarily, and our commerce has increased throughout protracted maritime wars? To this there can only be one answer, viz., that the arrangements for defence were effectual. What, then, were these arrangements? They were comprised in the provision of a powerful, well-distributed, well-handled Navy, and of a mobile army of suitable strength. It is to be observed that each element possessed the characteristic of mobility. We have to deal here more especially with the naval element, and we must study the manner in which it operates.

Naval war is sea-power in action; and sea-power, taken in the narrow sense, has limitations. It may not, even when so taken, cease to act at the enemy's coast-line, but its direct influence extends only to the inner side of a narrow zone conforming to that line. In a maritime contest each side tries to control the ocean communications and to prevent the other from controlling them. If either gains the control, something in addition to sea-power strictly defined may begin to operate: the other side's territory may be invaded or

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harassed by considerable raids, and its commerce may be driven from the sea. It will be noticed that control of ocean communications is the needful preliminary to these. It is merely a variant of the often employed expression of the necessity, in war, of obtaining command of the sea. In the case of the most important portion of the British Empire, viz., the United Kingdom, our loss of control of the ocean communications would have a result which scarcely any foreign country would experience. Other countries are dependent on importations for some part of the food of their population and of the raw material of their industry; but much of the importation is, and perhaps all of it may be, effected by land. Here, we depend upon imports from abroad for a very large part of the food of our people, and of the raw material essential to the manufacture of the commodities by the exchange of which we obtain necessary supplies; and the whole of these imports come, and must come to us, by sea. Also, if we had not freedom of exportation our wealth and the means of supporting a war would disappear. Probably all the greater Colonies and India could feed their inhabitants for a moderately long time without sea-borne imports, but unless the sea were open to them their prosperity would decline.

This teaches us the necessity to the British Empire of controlling our maritime communications, and equally teaches those who may one day be our enemies the advisability of preventing us from doing so. The lesson in either case is driven farther home by other considerations connected with communications. In war a belligerent has two tasks before him. He has to defend himself and hurt his enemy. The more he hurts his enemy, the less is he likely to be hurt himself. This defines the great principle of offensive defence. To act in accordance with this principle, a belligerent should try, as the saying goes, to carry the war into the enemy's country. He should try to make his opponents fight where he wants them to fight, which will probably be as far as possible from his own territory and as near as possible to theirs. Unless he can do this, invasion and even serious raids by him will be out of the question. More than that, his inability to do it will virtually indicate that on its part the other side can fix the scene of active hostilities unpleasantly close to the points from which he desires to keep its forces away.

A line of ocean communications is vulnerable throughout its length; but it does not follow that an assailant can operate against it with equal facility at every point, nor does it follow that it is at every point equally worth assailing. Lines running past hostile naval ports are especially open to assault in the part near the ports; and lines formed by the confluence of two or more other lines—like,

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for example, those which enter the English Channel—will generally include a greater abundance of valuable traffic than others. Consequently there are some parts at which an enemy may be expected to be more active than elsewhere, and it is from those very parts that it is most desirable to exclude him. They are, as a rule, relatively near to the territory of the state whose Navy has to keep the lines open, that is to say, prevent their being persistently beset by an enemy. The necessary convergence of lines towards that state's ports shows that some portion of them would have to be traversed, or their traversing be attempted, by expeditions meant to carry out either invasion or raids. If, therefore, the enemy can be excluded as above mentioned, invasions, raids, and the more serious molestation of seaborne commerce by him will be prevented.

If we consider particular cases we shall find proof upon proof of the validity of the rule. Three great lines—one from the neighbourhood of the Cape of Good Hope, one from the Red Sea, and a third from India and Ceylon—converge near the south-western part of Australia and run as one line towards the territory of the important states farther east. If an assailant can be excluded from the latter or combined line he must either divide his force or operate on only one of the confluents, leaving the rest free. The farther he can be pushed back from the point of confluence the more effectually will he be limited to a single line, because the combining lines, traced backwards, trend more and more apart, and it is, therefore, more and more difficult for him to keep detachments of his force within supporting distance of each other if they continue to act against two or more lines. The particular case of the approaches to the territory of the United Kingdom has the same features and proves the rule with equal clearness. This latter case is so often adduced without mention of others, that there is some risk of its being believed to be a solitary one. It stands, however, exactly on all fours with all the rest as regards the principle of the rule.

A necessary consequence of an enemy's exclusion from the combined line as it approaches the territory to be defended is—as already suggested—that invasion of that territory and serious raids upon it will be rendered impracticable. Indeed, if the exclusion be absolutely complete and permanent, raids of every kind and depredations on commerce in the neighbourhood will be prevented altogether. It should be explained that though lines and communications are spoken of, it is the area crossed by them which is strategically important. A naval force, either guarding or intending to assail a line, does not necessarily station itself permanently upon it. All that it has to do is to remain, for the proper length of time, within

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the strategic area across which the defended or threatened line runs. The strategic area will be of varying extent, its boundaries being determined by circumstances. The object of the defence will be to make the area from which the enemy's ships are excluded as extensive as possible. When the enemy has been pushed back into his own waters and into his own ports the exclusion is strategically complete. The sea is denied to his invading and important raiding expeditions, and indeed to most of his individual cruisers. At the same time it is free to the other belligerent. To effect this a vigorous offensive will be necessary.

The immediate theatre of operations, the critical strategic area, need not be, and often ought not to be, near the territory defended by our Navy. It is necessary to dwell upon this, because no principle of naval warfare has been more frequently or more seriously misapprehended. Misapprehension of it has led to mischievous and dangerous distribution of naval force and to the squandering of immense sums of money on local defence vessels; that is, vessels only capable of operating in the very waters from which every effort should be made to exclude the enemy. Failure to exclude him from them can only be regarded as, at the very least, yielding to him an important point in the great game of war. If we succeed in keeping him away, the local defence craft of every class are useless and the money spent on them has been worse than wasted because, if it had not been so spent, it might have been devoted to strengthening the kind of force which must be used to keep the enemy where he ought to be kept, viz., at a distance from our own waters.

The demand that ships be so stationed that they will generally, and except when actually cruising, be within sight of the inhabitants, is common enough in the mother country, and perhaps even more common in the over-sea parts of the British Empire. Nothing justifies it but the honest ignorance of those who make it; nothing explains compliance with it but the deplorable weakness of authorities who yield to it. It was not by hanging about the coast of England with his Fleet that Hawke or Nelson saved the country from invasion, nor was it by remaining where they could be seen by the fellow-countrymen of their crews that the French and English Fleets shut up their enemy in the Baltic and Black Sea, and thus gained and kept undisputed command of the sea which enabled them, without interruption, to invade their enemy's territory.

The condition insisted upon by the Australasian Governments in the agreement formerly made with the Home Government, that a certain number of ships, in return for an annual contribution of money, should always remain in Australasian waters, was in reality greatly

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against the interests of that part of the Empire. The Australasian taxpayer was, in fact, made to insist upon being injured in return for his money. The proceeding would have been exactly paralleled by a householder who might insist that a fire-engine, maintained out of rates to which he contributes, should always be kept within a few feet of his front door, and not be allowed to proceed to the end of the street to extinguish a fire threatening to extend eventually to the householder's own dwelling. When still further localised naval defence—localised defence, that is, of what may be called the smaller description—is considered, the danger involved in adopting it will be quite as apparent, and the waste of money will be more obvious. Localised defence is a near relation of passive defence. It owes its origin to the same sentiment, viz., a belief in the efficacy of staying where you are instead of carrying the war into the enemy's country.

There may be cases in which no other kind of naval defence is practicable. The immense costliness of modern Navies puts it out of the power of smaller states to maintain considerable sea-going fleets. The historic maritime countries—Sweden, Denmark, the Netherlands, and Portugal, the performances of whose seamen are so justly celebrated—could not now send to sea a force equal in number and fighting efficiency to a quarter of the force possessed by any one of the chief naval Powers. The countries named, when determined not to expose themselves unarmed to an assailant, can provide themselves only with a kind of defence which, whatever its detailed composition, must be of an intrinsically localised character.

In their case there is nothing else to be done; and in their case defence of the character specified would be likely to prove more efficacious than it could be expected to be elsewhere. War is usually made in pursuit of an object valuable enough to justify the risks inseparable from the attempt to gain it. Aggression by any of the countries that have been mentioned is too improbable to call for serious apprehension. Aggression against them is far more likely. What they have to do is to make the danger of attacking them so great that it will equal or outweigh any advantage that could be gained by conquering them. Their wealth and resources, compared with those of great aggressive states, are not large enough to make up for much loss in war on the part of the latter engaging in attempts to seize them. Therefore, what the small maritime countries have to do is to make the form of naval defence to which they are restricted efficacious enough to hurt an aggressor so much that the victory which he may feel certain of gaining will be quite barren. He will get no glory, even in these days of self-advertisement, from

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the conquest of such relatively weak antagonists; and the plunder will not suffice to repay him for the damage received in effecting it.

The case of a member of the great body known as the British Empire is altogether different. Its conquest would probably be enormously valuable to a conqueror; its ruin immensely damaging to the body as a whole. Either would justify an enemy in running considerable risks, and would afford him practically sufficient compensation for considerable losses incurred. We may expect that, in war, any chance of accomplishing either purpose will not be neglected. Provision must, therefore, be made against the eventuality. Let us, for the moment, suppose that, like one of the smaller countries whose case has been adduced, we are restricted to localised defence. An enemy not so restricted would be able to get, without being molested, as near to our territory—whether in the mother country or elsewhere—as the outer edge of the comparatively narrow belt of water that our localised defences could have any hope of controlling effectively. We should have abandoned to him the whole of the ocean except a relatively minute strip of coast-waters. That would be equivalent to saying good-bye to the maritime commerce on which our wealth wholly, and our existence largely, depends. No thoughtful British subject would find this tolerable. Every one would demand the institution of a different defence system. A change, therefore, to the more active system would be inevitable. It would begin with the introduction of a cruising force in addition to the localised force. The unvarying lesson of naval history would be that the cruising division should gain continuously on the localised. It is only in times of peace, when men have forgotten, or cannot be made to understand what war is, that the opposite takes place.

If it be hoped that a localised force will render coast-wise traffic safe from the enemy, a little knowledge of what has happened in war and a sufficiently close investigation of conditions will demonstrate how baseless the hope must be. Countries not yet thickly populated would be in much the same condition as the countries of Western Europe a century ago, the similarity being due to the relative scarcity of good land communications. A part—probably not a very large part—of the articles required by the people dwelling on and near the coast in one section would be drawn from another similar section. These articles could be most conveniently and cheaply transported by water. If it were worth his while, an enemy disposing of an active cruising force strong enough to make its way into the neighbourhood of the coast waters concerned would interrupt the "long-shore traffic" and defy the efforts of a localised force to prevent him. The history of the Great War, at the end of the eighteenth century and the

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beginning of the nineteenth, teems with instances of interruption by our Navy of the enemy's coastwise trade when his ocean trade had been destroyed. The history of the American War of 1812 supplies other instances.

The localised defence could not attempt to drive off hostile cruisers remaining far from the shore and meaning to infest the great lines of maritime communication running towards it. If those cruisers are to be driven off at all it can be done only by cruising ships. Unless, therefore, we are to be content to leave our ocean routes, where most crowded and therefore most vulnerable, to the mercy of an enemy, we must have cruisers to meet the hostile cruisers. If we still adhere to our localised defence, we shall have two distinct kinds of force—one provided merely for local, and consequently restricted, action; the other able to act near the shore or far out at sea as circumstances may demand. If we go to the expense of providing both kinds, we shall have followed the example of the sage who cut a large hole in his study door for the cat and a small one for the kitten.

Is local naval defence, then, of any use? Well, to tell the truth, not much; and only in rare and exceptional circumstances. Even in the case of the smaller maritime countries, to which reference has been made above, defence of the character in question would avail little if a powerful assailant were resolved to press home his attack. That is to say, if only absolute belligerent considerations were regarded. In war, however, qualifying considerations can never be left out of sight. As the great Napoleon observed, you can no more make war without incurring losses than you can make omelettes without breaking eggs. The strategist—and the tactician also, within his province—will always count the cost of a proposed operation, even where they are nearly certain of success. The occupation of a country, which would be of no great practical value to you when you got it, would be a poor return for the loss to which you would have been put in the process. That loss might, and probably would, leave you at a great disadvantage as regards enemies more nearly on an equality with yourself. It would, therefore, not be the improbability of breaking down the local naval defence of a minor maritime state, but the pressure of qualifying and only indirectly belligerent considerations, that would prevent its being attempted.

In a struggle between two antagonists of the first rank, the circumstances would be different. Purely belligerent considerations would have fuller play. Mistakes will be made, of course, for war is full of mistakes; but it may be accepted that an attack on any position, however defended, is in itself proof that the assailant

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believed the result hoped for to be quite worth the cost of obtaining it. Consequently, in a struggle as assumed, every mode of defence would have to stand on its intrinsic merits, nearly or quite unaided by the influence of considerations more or less foreign to it. Every scrap of local defence would, in proportion to its amount, be a diminution of the offensive defence. Advocates of the former may be challenged to produce from naval history any instance of local naval defence succeeding against the assaults of an actively aggressive Navy. In the late war between Japan and Russia the Russian local defence failed completely.

In the last case, a class of vessel like that which had failed in local defence was used successfully, because offensively, by the Japanese. This and many another instance show that the right way to use the kind of craft so often allocated to local defence is to use them offensively. It is only thus that their adoption by a great maritime power, like the British Empire, can be justified. The origin and centre of our naval strength are to be looked for in the United Kingdom. The shores of the latter are near the shores of other great maritime Powers. Its ports, especially those at which its Fleets are equipped and would be likely to assemble on the imminence of war, are within reach of more than one foreign place from which small swift craft to be used offensively might be expected to issue. The method of frustrating the efforts of these craft giving most promise of success is to attack them as soon as possible after they issue from their own port. To the acceptance of this principle we owe the origin of the destroyer, devised to destroy hostile torpedo-boats before they could reach a position from which they would be able to discharge with effect their special weapon against our assembled ships. It is true that the destroyer has been gradually converted into a larger torpedo-boat. It is also true that when used as such in local defence, as at Port Arthur, her failure was complete; and just as true that she has never accomplished anything except when used offensively.

When, therefore, a naval country's coast is so near the ports of another naval country that the latter would be able with swift small craft to attack the former's shipping, the provision of craft of a similar kind is likely to prove advantageous. War between Great Powers is a two-sided game, and what one side can do the other will at least be likely to attempt. Nothing supports the view that it is well—either above or beneath the surface of the water—to stand on the defensive and await attack. Everything points to the superiority of the plan of beating up the enemy's quarters and attacking him before he can get far from them on his way towards his objective. Consequently the only justification of expending money on the

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localised vessels of which we have been speaking, is the probability that an enemy would have some of his bases within reach of those vessels' efforts. Where this condition does not exist, the money expended is, from the belligerent point of view, thrown away. Here comes in the greatest foe of belligerent efficiency, viz., political expediency. In time of peace it is thought better to conciliate voters than to prepare to meet an enemy. If local defence is thought to be pleasing to an inexpert electorate, it is only too likely to be provided, no matter how ineffectual and how costly in reality it will turn out to be.

Not only is the British Empire the first of naval Powers, it is also the first of Colonial Powers. One attribute is closely connected with the other; neither, without the other, would be applicable. The magnitude of our colonial domain, and especially the imposing aspects of some of its greater components—the Dominion, the Commonwealth, South Africa, New Zealand—are apt to blind us to a feature of great strategical importance, and that is the abundance and excellence of the naval bases that stud our ocean lines of communication. In thinking of the great daughter states we are liable to forget these; yet our possession of them helps greatly to strengthen our naval position, because it facilitates our assuming a far-reaching offensive. By themselves, if not too numerous, they can afford valuable support to the naval operations that are likely to prove most beneficial to us. The fact that they are ours, and not an opponent's, also constitutes for us an advantage of importance. Of course, they have to be defended, or else they may fall into an opponent's hands. Have we here a case in which highly localised or even passive defences are desirable? No doubt we did act for a time as though we believed that the question could only be answered in the affirmative; but that was when we were under the influence of the feelings engendered by observation of the long series of land wars previously discussed.

Perhaps we have not yet quite shaken off the effects of that influence; but we have at least got so far as to tolerate the statement of the other side of the question. It would be a great mistake to suppose that the places alluded to are meant to be ports of refuge for our ships. Though they were to serve that purpose occasionally in the case of isolated merchant vessels, it would be but an accident, and not the essence, of their existence. What they are meant for is to be utilised as positions where our men-of-war can make reasonably sure of finding supplies and the means of refit. This assurance will largely depend upon their power of resistance if attacked. Before we can decide how to impart that power to them we shall have to see

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the kind of attack against which they would have to be prepared. If they are on a continent like, for example, Gibraltar, attack on them by a land force, however improbable, is physically possible. Against an attack of the kind a naval force could give little direct help. Most of our outlying naval bases are really or virtually insular, and are open to attack only by an expedition coming across the sea. An essential characteristic of a naval base is that it should be able to furnish supplies as wanted to the men-of-war needing to replenish their stocks. Some, and very often all, of these supplies are not of native production and must be brought to the base by sea. If the enemy can stop their conveyance to it, the place is useless as a base and the enemy is really in control of its communications. If he is in control of its communications he can send against it as great an expedition as he likes, and the place will be captured or completely neutralised. Similarly, if we control the communications, not only can supplies be conveyed to it, but also no hostile expedition will be allowed to reach it. Thus the primary defence of the outlying base is the active, sea-going Fleet. Moderate local defence, chiefly of the human kind in the shape of a garrison, will certainly be needed. Though the enemy has not been able to obtain control of the communications of the place, fitful raids on it will be possible; and the place should be fortified enough and garrisoned enough to hold out against the inconsiderable assaults comprised in these till our own ships can drive the enemy's away.

Outlying naval bases, though but moderately fortified, that contain depôts of stores, docks, and other conveniences, have the vice of all immobile establishments. When war does come, some of them almost certainly, and all of them possibly, may not be in the right place with regard to the critical area of operations. They cannot, however, be moved. It will be necessary to do what has been done over and over again in war, in the latest as well as in earlier wars, and that is, establish temporary bases in more convenient situations. Thus much, perhaps all, of the cost and trouble of establishing and maintaining the permanent bases will have been wasted. This inculcates the necessity of having not as many bases as can be found, but as few as it is possible to get on with.

The control of ocean communications, or the command of the sea, being the end of naval warfare, and its acquisition being practicable only by the assumption of a vigorous offensive, it follows as a matter of course that we must have a strong and in all respects efficient mobile Navy. This is the fundamental condition on which the continued existence of the British Empire depends. It is thoroughly well known to every foreign Government, friendly or unfriendly.

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The true objective in naval warfare is the enemy's Navy. That must be destroyed or decisively defeated, or intimidated into remaining in its ports. Not one of these can be effected without a mobile, that is a sea-going, Fleet. The British Empire may fall to pieces from causes as yet unknown or unsuspected: it cannot be kept together if it loses the power of gaining command of the sea. This is not a result of deliberate policy: it is inherent in the nature of the Empire, scattered as its parts are throughout the world, with only the highway of the sea between them.

Such is the position of the Fleet in the defence of the Empire: such are its duties towards it. Duties in the case are mutual, and some are owed to the Fleet as well as by it. It is incumbent on every section of the Empire, without neglecting its land forces, to lend zealous help in keeping the Fleet efficient. It is not to be supposed that this can be done only by making pecuniary contributions to its maintenance. It is, indeed, very doubtful if any real good can be done by getting colonies to make them. It seems certain that the objections to this are greater than any benefit that it can confer. Badgering our fellow-subjects beyond sea for money payments towards the cost of the Navy is undignified and impolitic. The greatest sum asked for by the most exacting postulant would not equal a twentieth part of the imperial naval expenditure, and would not save the taxpayer of the mother country a farthing in the pound of his income. No one has yet been able to establish the equity of a demand that would take something from the inhabitants of one Colony and nothing from those of another.

There are other ways in which every trans-marine possession of the Crown can lend a hand towards perfecting the efficiency of the Fleet—ways, too, which would leave each in complete and unmenaced control of its own money. Sea-power does not consist entirely of men-of-war. There must be docks, refitting establishments, magazines, and depôts of stores. Ports which men-of-war must visit at least occasionally in war for repair or replenishment of supplies will have to be made secure against the assaults which it has been said that a hastily raiding enemy, notwithstanding our general control of the communications, might find a chance of making. Moderate fixed fortifications are all the passive defence that would be needed; but good and active troops must be available. If all these are not provided by the part of the Empire in which the necessary naval bases lie, they will have to be provided by the mother country. If the former provides them the latter will be spared the expense of doing so, and spared expense with no loss of dignity, and with far less risk of friction and inconvenience than if her taxpayers' pockets had

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been nominally spared to the extent of a trifling and reluctantly paid money contribution.

It has been pointed out on an earlier page that a country can be, and most probably will be, more effectually defended in a maritime war if its Fleet operates at a distance from rather than near its shores. Every subject of our King should long to see this condition exist if ever the Empire is involved in hostilities. It may be—for who can tell what war will bring?—that the people of some great trans-marine dependency will have to choose between allowing a campaign to be conducted in their country or forcing the enemy to tolerate it in his. If they choose the latter they must be prepared to furnish part at least of the mobile force that can give effect to their choice. That is to say, they must be prepared to back up our sea-power in its efforts to keep off the tide of war from the neighbourhood of their homes. History shows how rarely, during the struggle between European nations for predominance in North America, the more settled parts of our former American Colonies were the theatre of war: but then the colonists of those days, few comparatively as they were, sent strong contingents to the armies that went campaigning in the territory of the various enemies. This was in every way better—the sequel proved how much better—than a money contribution begged or extorted.

Helping in the manner first suggested need not result in dissociating King Edward's subjects beyond the seas from participation in the work of the active sea-going Fleet. It is now, and still would be, open to them as much as to any native or denizen of the mother country. The time has fully come when the people of the greater outlying parts of the Empire should insist upon perfect equality of treatment with their home fellow-subjects in this matter. They should resent, as a now quite out-of-date and invidious distinction, any difference in qualification for entry, locality of service, or remuneration for any rank or rating. Self-respect and a dignified confidence in their own qualities, the excellence of which has been thoroughly tested, will prompt the King's colonial subjects to ask for nothing but equal chances in a force on which is laid so large a part of the duty of defending the Empire. Why should they cut themselves off from the promising career that service in the Royal Navy opens to the capable, the zealous, and the honourable aspirant of every grade? Some of the highest posts in the Navy are now, or lately have been, held by men who not only happened to be born in British Colonies, but who also belong to resident colonial families. Surely in this there is a strong moral cement for binding and keeping the Empire together. It is unnecessary to expatiate on the contrast

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between the prospect of such a career and that which is all that a small local service could offer. It would soon be seen towards which the enterprising and the energetic would instinctively gravitate. The proposed plan, if ever adopted, of reserving duty in a local flotilla for officers and men entering the Royal Navy from His Majesty's over-sea dominions is not likely to be adhered to for long.

In the defence of the British Empire the Fleet holds a two-fold position. To its general belligerent efficiency, its strength and activity, we must look if the plans of an enemy are to be brought to nought. It, and it only, can secure for us the control of the ocean communications, on the freedom of which from serious interruptions the prosperity—indeed, the existence—of a scattered body must depend. In time of peace it can be made a great consolidating force, fostering every sentiment of worthy local patriotism whilst obliterating all inclination to mischievous narrow particularism, and tending to perfect the unity which gives virtue to national grandeur and is the true secret of national independence and strength.

CYPRIAN A. G. BRIDGE.

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CHAPTER X.

Naval and Maritime Industries in Italy.

All the Italian industries connected with the sea declined with the advent of steam navigation, and as soon as wood ceased to be the principal material for shipbuilding. The country, as everybody knows, is barren of solid mineral fuel, and poor of liquid fuel. Iron ore is extracted in very moderate quantity from the soil in the island of Elba, and, up to the eighties, was all exported under contracts made with foreign companies by the old Government of the Duchy of Tuscany. Under these circumstances, although the country had more than 150,000 able-bodied seafaring men, and as many boatmen, longshore fishermen, carpenters, caulkers, smiths, &c., it could not vie with other countries in modern shipbuilding. Moreover, Count Cavour and the statesmen of his school were all free traders, not perhaps from personal conviction, but from their keen desire to enlist in favour of the national cause the sympathy and the interest of England, then the exclusive exporter of ready made iron steamers.

Our modern industries began their development when mild steel commenced to be used as a shipbuilding material. About 1880 Messrs. Tardy and Beneck, of Savona, and Mr. Raggio, of Genoa, began to supply mild steel to the Royal dockyards and to the three shipbuilding firms of Giovanni Ansaldo, at Sampierdarena, Niccolò Odero, at Sestri Ponente, and Orlando Bros., at Leghorn. But the output of the above-mentioned steel works could not cope with the demand, and most of the steel for shipbuilding was obtained from England and France.

Benedetto Brin.

In 1885, after the disclosures of a Parliamentary inquiry on the lamentable condition of the mercantile marine and of the industries connected with it and with the Navy, a law for the protection of the naval industries, proposed by the late Benedetto Brin, then Minister of the Navy, was passed. The ever-lamented statesman completed the work of reconstruction of the Fleet with two measures of the utmost importance. First, he induced (one could even say forced) Giovanni Ansaldo, of Sampierdarena, and Guppy, of Naples, to enter respectively into partnership with the English firms of Maudslay and

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Hawthorn, in order that the two former could furnish to the Royal Navy propelling machinery for large war vessels. Secondly, he caused Sir William Armstrong to set up at Pozzuoli an ordnance factory, and induced an Italian company to establish a steel plant at Terni for the production of armour plates. Finally, he induced the Schwarzkopf Company, of Berlin, to erect works in Venice for the production of torpedoes. All this was the work of two years, between 1884 and 1885, under the personal influence of a far-seeing man of strong will, to whom even his political adversaries could not deny the merit of having enabled Italy to produce in its various establishments all the naval material indispensable for the Navy and the mercantile marine. The happy results of which Italy is to-day so proud are due almost entirely to Brin's idea of calling in English capital and English industrial organisation to co-operate with Italian workmanship. Without Brin our steel naval industries would still be in their infancy, as in the early days when our work in ship-building was practically limited to the riveting together of the material supplied by English and French steel factories.

Law of 1885.

The law of 1885, by which a premium was awarded to ship-builder in propsor totion the tonnage of steel ships built and to the engine power fitted into them, provided they were constructed in Italian private yards, and a second premium was paid to the owners in proportion to tonnage and distance run by their ships, afforded to Italy the means of developing her private shipbuilding establishments as well as her Navy. In point of fact, save the protected cruisers Piemonte and Dogali and about two dozen sea-going torpedo boats ordered in Germany, all the vessels of the Fleet since 1885 have been built at home, their machinery constructed in national factories, their armour plates hammered at Terni, and their torpedoes made at Venice. The firms of Giovanni Ansaldo and Nicolò Odero, in Sestri-Ponente, of Orlando Bros., in Leghorn, of Guppy, and of Pattison, in the Gulf of Naples, having undertaken the construction of many of the hulls and of all the engines, reaped fine profits by the protective *régime*, as the Government took care to distribute orders in a fair way with the avowed intent of maintaining economic equilibrium and promoting emulation rather than rivalry. Nevertheless, as tutelage is seldom conducive to a proper industrial organisation, so a *régime* of protection fails to hatch progress. The law of 1885, as well as the successive laws voted by Parliament in 1896 and 1901, modelled on the French protective laws, were far from producing a revival of the mercantile marine.

Strange as it may seem, the present organisation that I am about to illustrate, and which has put the Italian maritime firms in a

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position to accept orders from abroad, and to vie with those of France and Germany, sprung from the defective spirit of the above-mentioned law of 1896, which created a conflict between the interests of the steel-makers, of the shipbuilder and the shipowner. Worse than all, there was only one factory for armour and one for guns, which gave to each the power to exercise a pressure upon the State as well as upon the shipbuilders.

About the same time the Argentine Republic wanted some armoured vessels delivered quickly to oppose to those ordered in England by Chili, and as the slips in England, France, Germany, and the United States were fully engaged, she applied to the Italian market. The Italian Government then gave permission first to Giovanni Ansaldo, then to Orlando Bros., to dispose each of an armoured cruiser they had on the stocks, under the condition to build other cruisers within the contract time and with improvements. The operation was repeated for three more cruisers, one of which was purchased by Spain. Later on two cruisers of the same type were built for the Argentine Republic and transferred afterwards to Japan.

The financial restoration of Italy dates from the renewal of fair commercial relations with France, and coincides with our currency reaching to par. This fact has had a reflex action upon industries in general and upon maritime industries in particular. Capital that, so far, had been shy of investment in ventures connected with the sea became confident in their ultimate success, so that shipbuilding yards were opened at Riva Trigoso, at Muggiano, Ancona, and Palermo. The largest part of the capital for these yards has been raised in the country, although there was more than one example of British money invested in Italian maritime business.

As stated before, the laws of 1885, modified in 1901, did not content any of the maritime interests. They found in close association a remedy to the evil. The three shipyards of Ancona, Muggiano, and Palermo, under the new name of *Cantieri Riuniti*, those of Odero at Sestri and Foce, and of Orlando Bros. at Leghorn became associated with the metallurgic group of the Terni factory, that in its turn controls the steel and iron works of Savona and of Elba, and intends to open a new establishment at Naples under the name of Ilva. By this arrangement, up to the present day, while Terni supplies Krupp steel plates of its own make to the shipyards, Elba produces cast-iron that Savona and Sestri transform into mild steel.

About the beginning of 1903 another important firm already mentioned, viz., Giovanni Ansaldo & Co., became merged into the new firm

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of Giovanni Ansaldo, Armstrong & Co. Commendatore F. M. Perrone, through whose exertions the Argentine Republic and Spain purchased in Italy most of the armoured cruisers above mentioned, worked out the financial and technical basis on which Sir William Armstrong, Whitworth & Co. joined the new concern, of which Commendatore Perrone is the responsible head. To have caused the world-famed English firm to come into partnership in all that regards ordnance and torpedoes with the oldest Italian shipbuilding establishment is certainly a masterly stroke. Nevertheless the two elements of the combine—I mean the ordnance factory of Pozzuoli, belonging to Armstrong, Whitworth & Co., and the Ansaldo works—will have still a separate administrative existence, while the new firm, Giovanni Ansaldo, Armstrong & Co. is moving a further step towards the completion of its programme in creating an armour factory, in order to meet the contingency of orders, national or foreign, for war vessels of any description.

Thus, to balance the power of the Terni group, there stands another financial and industrial combine, which controls the several establishments of Sestri-Ponente, Cornigliano and Genoa in the north, and the Pozzuoli ordnance factory in the south. This second group, that disposes at present of all naval material of its own make save armour, will shortly produce even Krupp steel plates. How advantageous for the Navies in general, and for the Italian in particular, is the existence of two independent organisations able to compete both in prices and good workmanship is obvious. The evil of the protective *régime* is thus in a great measure removed.

A brief historical and descriptive sketch of the Italian private shipbuilding establishments may not be out of place here. I shall mention solely those that can supply vessels fitted for actual service.

Ansaldo & Co.

In the year 1853 Count Cavour, foreseeing the future of the kingdom of Sardinia, founded the house of Giovanni Ansaldo & Co., putting at its head a university professor of repute, Mr. Ansaldo. Four years after, at the death of Professor Ansaldo, Count Cavour called the brothers Luigi and Paolo Orlando—exiled from Sicily—to the direction of the works. At first Cavour had only contemplated the construction of railway *matériel;* but Luigi Orlando caused the expansion of the establishment for the construction of marine engines, and when he left it in 1865 for Leghorn Ansaldo & Co. were in a position to undertake the construction of the engines of the ironclad Palestro (1867) and of the despatch boats Staffetta and Marco Antonio Colonna. Heavy iron forgings, such as the stern posts and rams for the battleships Duilio, Dandolo, Lepanto, and Italia, were

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made at Ansaldo's. In 1883 the property passed into the hands of Messrs. Giovanni and Carlo Marcello Bombrini, who gave a more vigorous impulse to the business. The old workshops of Sampierdarena were enlarged to cover an area of 40,000 square mètres, well equipped for turning out marine boilers (Scotch and water-tube boilers of all kinds), locomotives, marine and turbine engines (Parsons'), and were provided with a pier for shipping and unshipping material and the heaviest pieces of machinery. The engine works have since 1883 supplied the Royal Navy with the propelling machinery for the battleships Sicilia (19,500 h.-p.), Regina Margherita (19,000 h.-p.), Ammiraglio Saint Bon (13,500 h.-p.); for the armoured cruisers Marco Polo (10,700), Garibaldi (14,300); for the protected cruisers Savoia, Galileo, Amerigo Vespucci, Archimede, Goito, Monzambano, Stromboli, Minerva, and Liguria (representing in the aggregate 41,400 h.-p.); for the destroyer Condore and for eighteen torpedo boats. In the same works the following foreign ships were engined: Garibaldi and Pueyrredon, of 13,500 h.-p. each, of the Argentine Navy; Cristobal Colon (13,500 h.-p.), sunk at Santiago under the Spanish flag; the Japanese cruisers Kasuga and Nisshin (13,500 h.-p.); the Turkish battleship Messoudieh (11,000 h.-p.); and eleven torpedo boats, also for Turkey. Eighteen Italian merchant steamers have been provided with engines issued from Ansaldo's. Their aggregate horse-power is 52,500.

Ansaldo-Armstrong.

At present Ansaldo-Armstrong have in construction a set of two turbine engines for the armoured cruiser San Marco (18,000 h.-p.), and the engines of the battleship Roma (20,000 h.-p., Belleville boilers), which is completing in the Royal Dockyard at Spezia; engines of 6000 h.-p. for the destroyers of 28·5 knots, and lastly the propelling machinery for the two trans-Atlantic steamers Virginia and Europa.

West of Sampierdarena, in the neighbouring village of Cornigliano, Ansaldo, Armstrong & Co. have set up three workshops, covering a total of 69,000 square mètres, viz., an electric workshop for all kinds of electric machinery, either for sea boats, men-of-war and merchant steamers, or for land use; a bronze foundry and a steel foundry, which not only supply all the castings needed by the firm, but also are busy for the general market.

At Sestri-Ponente the company has a well equipped shipyard; the grounds are very extensive, covering about 96,000 square mètres, with a sea front of about 500 mètres, facing the slips, four of which are in masonry and fit for big and long ships. The shipyard machine tools are all worked by electricity from a central station.

The aggregate displacement of naval ships built by Ansaldo-

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Armstrong for foreigners amounts to 38,258 tons, while for the Italian Navy it only amounts to 12,520 tons. The tonnage of merchant ships amounts to 31,151 tons for steamers and 9925 tons for sailing ships. The merchantmen, both steamers and sailing vessels, and also unarmoured vessels, are generally launched at Sestri Ponente, complete and ready for immediate service. Big men-of-war are transferred for completion, after launching, to the outfitting shop owned by the company at the Molo Giano, Genoa (6244 square mètres in all, 4900 walled and roofed), where the old Turkish ironclad Messoudieh was completely transformed and practically reconstructed; all the armoured cruisers of the Giuseppe Garibaldi type, which were designed by General Masdea, the head of the Royal Corps of Naval Architects, including the Kasuga and Nisshin, were completed, and the firm is now completing the battleship Napoli, of 13,000 tons and 20,000 h.-p. Inside the harbour of Genoa the firm have a small workshop covering an area of about 3200 square mètres, for repairs of merchant ships.

As the Turkish Navy is a good customer of Ansaldo, Armstrong & Co., the firm keeps in Constantinople a staff and a squad of skilled workmen, to whom the dockyard of Tophané entrusted the transformation, now completed, of three obsolete ironclads.

Pozzuoli.

The Ansaldo-Armstrong works at Pozzuoli, near Naples, extends over an area of 28 hectares, with a sea front of about 1500 mètres. The establishment was founded in 1886 by Sir William Armstrong, upon the advice of Rear-Admiral Count Albini, now President of the Board of Administration of the Ansaldo-Armstrong Company, and began to produce in the following year. It supplies both the Navy and the Army of Italy with modern ordnance of any description and employs about 1800 workmen, all Italians. The director of the factory is Comm. Roberto de Luca, Captain in the Reserve of the Royal Navy, who has under his orders a fine staff of artillery engineers, who are all Italians. The factory contains foundries for the different metals used in the manufacture of gun mountings as well as of ordnance of the different calibres.

The workshops, which are very extensive, and cover an area of 46,000 square mètres, are equipped according to the most modern requirements. They are connected together by rails, and also with a pier 220 mètres long, with four hydraulic cranes (the largest one of 160 tons power) for the shipment of the several heavy pieces that constitute a turret gun mounting. In short, Pozzuoli is the Italian Elswick. Its powers of production are better given by the following statistical returns than by words. From the year 1887 to the end of 1907 the Pozzuoli factory has supplied the Italian Navy

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with: One gun of 431 mm. for the ironclad Andrea Doria; 15 guns of 343 mm. for the battleships of the type Re Umberto, and for the forts of Maddalena Island; 19 12-in. guns for the battleships Regina Margherita, Benedetto Brin, Vittorio Emanuele III., Regina Elena, Napoli and Roma; 29 10-in. guns for the new armament of the Dandolo, the battleships Emanuele Filiberto and Ammiraglio Saint Bon, and the armoured cruiser Garibaldi, etc., besides 68 8-in. guns, 295 6-in. guns, 116 4·7-in. guns, and a large number of smaller quick-firers. Adding to these guns four howitzers of 280 mm. for the land batteries manned by the Army, the factory has supplied the Italian Government with 1109 pieces. Not only guns, but their mountings (turret or broadside according to calibre), projectiles, fuses, sights, ammunition, hoists, and torpedo tubes are supplied by the firm.

The Ministry of War has given lately many orders to the Pozzuoli factory, among which the most remarkable are the mounting for the 6-in. gun of our Alpine defences, and the armoured turret at the Island of San Paolo, near Taranto, which contains a couple of 120-ton guns manufactured at Elswick, has also been constructed at Pozzuoli. By a recent decree there have been ordered at Pozzuoli a great number of field batteries.

Odero and Orlando.

Another group of naval industries is constituted by the two shipyards of Sestri-Ponente and La Foce, owned by Odero & Co., formerly Nicolò Odero fu Alessandro, and by the shipyard of Orlando Bros., in Leghorn, now belonging to the firm of Orlando & Co. Odero's establishment at Sestri-Ponente is hardly fit for the construction of war vessels of large size, as it fronts an open beach, but it has built between 1883 and the present day nine torpedo-boats of the 3rd class, 26 of the 2nd, and the destroyers Astore, Arpia, Fulmine, Pellicano, Orione, Orsa, Orfeo, Olympia, measuring in aggregate 4500 tons and 50,800 h.-p. In 1891 the Urania, a torpedo cruiser of 846 tons and 4300 h.-p., was launched, opening the way to the construction of vessels of larger size, such as two double screw gunboats Bravo and Morelos, of 1200 tons, and the troopship Progreso, built for the Mexican Navy in 1904 and 1905. Five years before Mr. Odero had bought the shipyard at La Foce, east of Genoa, where, in the days of the old Navy, the Government used to build its wooden screw frigates. He furnished the shipyard with all modern appliances, reducing it to a model establishment. It has supplied the battleship Regina Elena with the propelling machinery of 19,000 h.-p., and it has on hand the Amalfi (10,200 tons, 20,000 h.-p.), sister-ship to the Pisa, both constructed upon plans of Mr. Giuseppe Orlando, of Leghorn. Commendatore

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Attilio Odero is the director of both the establishments of the firm.

Few shipyards are better located than that of Orlando & Co., at Leghorn. It is perfectly land-locked. When Orlando Bros., in 1866, leased from the Government the old San Rocco yard, it covered 50,000 square mètres; now it extends to 150,000, of which 79,000 are walled and roofed. The eight slips, the workshops, foundries, offices, and the dry dock (135 mètres long, and fit for ships of seven mètres' draught) face a water basin of 60,000 square mètres, eight mètres deep. The launching of large vessels and their fitting-out is easier in Leghorn than in any other Italian private yard, since the water of the basin is never disturbed by wind or sea. For this reason the firm has supplied the Italian Navy and three foreign navies with vessels of large displacement. The activity of the dock-yard that began in 1882 with the construction of the Lepanto (14,000 tons) has been growing year by year. Leghorn.

The displacement of war vessels supplied to the Italian Navy aggregate 85,576 tons. Propelling machinery supplied to ditto—h.-p., 126,260. The war vessels supplied to foreign powers have been as follows:—

	Tons.	H.-P.
To Argentine Republic	13,584	27,000
„ Portugal	3,705	10,000
„ Morocco	1,100	2,300

To the present day Messrs. Odero and Orlando, although partners in the Vickers-Terni Company, apply to the Pozzuoli Gun Factory for guns and ammunition, because the Vickers-Terni factory at Spezia is still in course of construction; but as they have financed the Fiat San Giorgio Company of Muggiano, which builds submarine boats, and the Officina Galileo in Florence, which produces sighting instruments and electrical plant of all kinds for naval use, they can obtain from the fountain head and on better conditions all that is required for the complete fitting out of a modern man-of-war.

The third centre of naval activity is at La Marina dei Granili, a few miles from Naples, where stand the old workshops of Hawthorne & Guppy, now Officine Meccaniche di Milano. The shallow water of the sea front preventing the building of ships, the firm turned to the construction of engines; it supplied the battleships Napoli and B. Brin with propelling machinery of 19,000 h.-p., the second-class battleship Emanuele Filiberto and the two armoured cruisers Ferruccio and Varese with machinery of 13,500 h.-p. each, the first-class battleship Sardegna with 17,500 h.-p. In addition to the above-mentioned vessels it supplied seven less important men-of-war with an aggregate horse-power of 33,000. Officine Meccaniche and Pattison.

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Pattison. Not far from the Granili stands Pattison's establishments, where several ships of small displacement have been built and engined. Pattison has supplied the Navy with ten destroyers, five of which are of 2900 h.-p. and the remainder of 6000 h.-p. Moreover, he has constructed the engines (13,260 h.-p.) for the armoured cruiser Vittor Pisani and for several protected ones.

In conclusion, it may be observed that the industrial development of naval Italy embraces two periods. In the first (1883–1903), the various firms fought their way under the control of the State. In the second, they shook it off and formed into two groups according to mutual affinities, in order to enter into competition with foreign establishments for the conquest of the international market. The year 1903 marks, then, a new departure.

JACK LA BOLINA.

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PART II.

LIST OF BRITISH AND FOREIGN SHIPS.
ORDNANCE TABLES.

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PART II.

LIST OF BRITISH AND FOREIGN SHIPS.

THE following abbreviations are used throughout the Alphabetical List:—

a.c. Armoured cruiser.	H.S. Harveyised or similar hard-faced steel.
a.g.b. Armoured gunboat.	K.S. Krupp steel.
b. Barbette ship.	shd. Sheathed.
c.b. Central-battery ship.	P. Protected.
c.d.s. Coast-defence ship.	*t.* Turret-ship (in class column).
comp. (in armour column). Compound or steel-faced armour.	*t.* Speed and I.H.P. at trials (in speed and I.H.P. columns).
cr. Cruiser.	to.cr. Torpedo-cruiser.
d.v. Despatch vessel.	to.g.b. Torpedo-gunboat.
g.b. Gunboat.	
g.v. Gun-vessel.	

l. Light guns under 15 cwt., including boats' guns.
M. Machine guns.
sub. Submerged torpedo tube.
A. Armstrong guns. K Krupp guns.

The following abbreviations are used to distinguish the various types of boilers:—

W.T. Water-tube boilers, where the type is not known.	My. Myabara.
B. Belleville.	Nic. Niclausse.
Bl. Blechynden.	Nor. Normand.
B. & W. Babcock and Wilcox.	N.S. Normand-Sigaudy.
D'A. D'Allest.	R. Reed.
D. Dürr.	T. Thornycroft.
E. Earle.	T.S. Thornycroft-Schulz.
Ex. Express.	W.F. White-Forster.
Du T. Du Temple.	Y^1. Yarrow small tube.
L. Laird.	Y^2. Yarrow large tube.
L.N. Laird-Normand.	V.E. Vickers Express.
M. Mumford.	cyl. Cylindrical.

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GREAT BRITAIN.—Armoured Ships.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
												Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Aboukir** shd.	12,000	440	69½	26¼	21,375 B.	Fairfield	Fairfield .	1900	1902	751,118	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	5	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	21·6 *t*	800 / 1600	755
a.c.	**Achilles** . .	13,550	480	73½	27	23,275 Y² & cyl.	Elswick .	Hawthorn	1905	1907	1,191,103*	6–4–3 K.S.	3–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 2 *12-pr.*, 28 *3-pr.*, 2 M.	3	23·27 *t*	1000	704
b.	**Africa** . .	16,350	425	78	26¾	18,698 B. & W. & cyl.	Chatham	J. Brown .	1905	1906	1,461,429*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6*-in., 26 small.	4	18·95 *t*	950 / 2150	776
b.	**Agamemnon** .	16,500	410	79½	27	17,285 Y²	Govan .	Hawthorn Leslie	1906	1908	1,649,011*	12–6 K.C.	..	8	8	12	..	4 *12-in.*, 10 *9·2-in.*, 24 *12-pr.*, 5 *3-pr.*, & 5 M.	5	18·75 *t*	900 / 2500	865
b.	**Albemarle** .	14,000	405	75½	26½	18,296 B.	Chatham	Thames Ironworks	1901	1903	1,009,835	7–3 K.S.	2–1	..	7 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·6 *t*	900 / 2000	750
b.	**Albion** . .	12,950	390	74	26	13,500 B.	Blackwall	Maudslay .	1898	1902	858,745	6–2 H.N.	3–1	6	12–8 H.N.	12–6 H.N.	5 H.N.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·25 *t*	1000 / 2300	700
a.c.	**Antrim** .	10,850	450	68½	25	21,604 Y. & cyl.	Clydeb'nk	J. Brown	1903	1905	906,335*	6–2 H.N.	2–¾	..	4½ H.N.	6 H.N.	6 H.N.	4 *7·5-in.*, 6 *6-in.*, 2 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·02 *t*	800 / 1950	655
a.c.	**Argyll** .					21,190 B. & W. & cyl.	Greenock	Greenock Foundry	1904	1906	906,308*									22·38 *t*		
a.c.	**Bacchante** shd.	12,000	440	69½	26¼	21,520 B.	Clydeb'nk	J. Brown	1901	1902	787,230	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	5	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	21·75 *t*	800 / 1600	755
b.	**Barfleur** . shd.	10,500	360	70	25½	13,163	Chatham	Greenock Foundry	1892	1894	582,605	12 *comp.*	2½–2	4 N.S.	8 *comp.*	9 *comp.*	4–2 N.S.	4 *10-in.*, 10 *6-in.*, 2 *9-pr.*, 8 *6-pr.*, 9 *3-pr.*, 7 M.	3	18·50	750 / 1240	625

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a.c.	**Bedford**	9800	440	66	24½	22,457 B.	Fairfield	Fairfield	1901	1903	706,020	4–2 K.S.	2–¾	..	3 K.S.	4 K.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 2 M., 2 l.	2	22·7 *t*	740 1760	687
b.	**Bellerophon**	18,600	490	82	27	23,000 B. & W.	Portsm'th	Fairfield	1907	..	1,766,590*	11 K.C.	..	..	..	11 K.C.	11 K.C.	10 *12-in.*, 24 *4-in.* . . .	..	20·25	900	..
a.c.	**Berwick**	9800	440	66	24½	22,000 Nic.	W. Beardmore & Co.	Humphrys	1902	1903	750,984	4–2 H.S.	2¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.G.	2	23·0	800 1600	655
a.c.	**Black Prince**	13,550	480	73½	27	23,939 B. & W. & cyl.	Blackwall	Thames Ironworks	1904	1906	1,193,414*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 10 *6-in.* 2 *12-pr.*, 28 *3-pr.*, 2 M.	3	23·65 *t*	1000 2000	704
b.	**Britannia**	16,350	425	78	26¾	18,725 B & W & cyl	Portsm'th	Humphrys	1904	1906	1,450,757*	9 H S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 16 *3-pr.*, M.	4	18·72 *t*	950 2150	776
b.	**Bulwark**	15,000	400	75	26¾	15,000 B.	Devonp't	Hawthorn	1899	1902	997,846	9 H.S.	3–2	3 K.S.	12 H.S.	12–5 H.S.	6–2 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·0	900 2000	750
b.	**Cæsar**	14,900	390	75	27½	12,000	Portsm'th	Maudslay	1896	1897	885,212	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 2000	757
b.	**Canopus**	12,950	390	74	26	13,500 B.	Portsm'th	Greenock Foundry	1897	1900	866,516	6 H.S.	3–1	6 N.S.	12 H.S.	12–5 H.S.	5 H.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·25	800 1850	700
a.c.	**Carnarvon**	10,850	450	68½	25	21,489 Nic.&cyl.	Beardm're	Humphrys	1903	1905	890,840*	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 *7·5-in.*, 6 *6-in.*, 2 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·3 *t*	800	655
b.	**Centurion** shd.	10;500	360	70	25½	13,214	Portsm'th	Greenock Foundry	1892	1893	593,050	12 *comp.*	2½–2	4 N S.	12 *comp.*	9 *comp.*	6–2 K.S.	4 *10-in.*, 10 *6-in.*, 8 *6-pr.*, 12 *3-pr.*, 7 M., 2 l.	3	18·25	750 1125	625
a.c.	**Cochrane**	13,550	480	73½	27	23,654 Y² & cyl.	Fairfield	Fairfield	1905	1906	1,193,121*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 2 *12 pr.*, 28 *3-pr.*, 2 M.	3	23·29 *t*	1000	704
b.	**Collingwood**	19,250	500	84	27	24,500 Y²	Devonp't	Hawthorn†	Bldg	..	..	..	..	..	..	..	..	..	..	21	900	..
b.	**Commonwealth**	16,350	425	78	26¾	18,538 B & W & cyl	Fairfield	Fairfield	1903	1905	1,481,811*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 16 *3-pr.*, M.	4	19·01 *t*	950 2150	776

* Total estimated cost of ship including guns.

† Turbine machinery.

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GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost	Armour.						Armament.		Speed.	Coal.	Complement.
												Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.		Guns.	Torpedo Tubes.			
																Heavy Guns.	Secondary.					
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Cornwall	9800	440	66	24½	22,000 B. & W.	Pembroke	Hawthorn	1902	1905	756,274	4–2 H.S.	2–¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	23·6 *t*	800 / 1600	655
b.	Cornwallis	14,000	405	75½	26½	18,238 B.	Blackwall	Thames S. Co.	1901	1904	1,030,302	7 K.S.	2–1	1½	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·9 *t*	900 / 2000	750
a.c.	Cressy . shd.	12,000	440	69½	26¼	21,240 B.	Fairfield	Fairfield	1899	1901	749,324	6 K.S.	3–2	..	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	20·79	800 / 1600	755
a.c.	Cumberland	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow Co.	1902	1904	718,168	4–2 K.S.	2–¾	..	5	5–4	4 N.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	23·0	800 / 1000	655
a.c.	Defence	14,600	490	74½	26	27,000 Y²	Pembroke	Scotts S. & E. Co.	1907	..	1,377,107*	6–4	1–½	3	..	8	7	4 *9·2-in.*, 10 *7·5-in.*, 2 *12-pr.*, 30 *3-pr.*, M.	5	23	1000	755
a.c.	Devonshire	10,850	450	68½	25	21,475 Nic. & cyl.	Chatham	Thames Ironworks	1904	1905	850,877*	6–2	2–¾	..	4½ K.S.	6 N.S.	6	4 *7·5-in.*, 6 *6-in.*, 2 *12-pr.*, 22 *3-pr.*, 2 M.	2	22·25	800 / 1600	655
b.	Dominion	16,350	425	78	26¾	18,438 B. & W. & cyl.	Barrow	Vickers	1903	1905	1,455,190*	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 K.S.	7	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 16 *3-pr.*, M.	4	19·5 *t*	950 / 2150	776
a.c.	Donegal	9800	440	66	24½	22,000 B.	Fairfield	Fairfield Co.	1902	1903	715,947	4–2 K.S.	2–¾	..	5 K.S.	5–4	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	23·0	800 / 1600	655
a.c.	Drake	14,100	500	71	26	31,450 B.	Pembroke	Humphrys	1901	1902	1,002,977	6 K.S.	3–2	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2	24·11 *t*	1250 / 2500	900
b.	Dreadnought	17,900	490	82	26½	27,500 B. & W.	Portsm'th	Vickers†	1906	1906	1,813,100*	11 K.C.	2¾–1¾	..	11	11–8	..	10 *12-in.*, 27 *12-pr.* Q.F.	5	21·85 *t*	900 / 2700	800
a.c.	Duke of Edinburgh	13,550	480	73½	27	23,685 B. & W. & cyl.	Pembroke	Hawthorn Leslie	1904	1906	1,201,687*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 28 *3-pr.*, 2 M.	3	22·84 *t*	1000	704
b.	Duncan	14,000	405	75½	26½	18,222 B.	Blackwall	Thames S. Co.	1901	1903	1,023,147	7 K.S.	2–1	1½ K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·9 *t*	900 / 2000	750

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b.	**Empress of India**	14,150	380	75	27½	13,000	Pembroke	Humphrys	1891	1893	846,321	18–5 *comp.*	3	5	16 *comp.*	17–6 *comp.*	6–2 K.N.C.	4 *13·5-in.*, 10 *6-in.*, 16 *6-pr.*, 12 *3-pr.*, 2 M., 2 l.	3	18·0 *t*	900 / 1450	740
a.c.	**Essex** . .	9,800	440	66	24½	22,000 B.	Pembroke	J. Brown .	1901	1903	736,557	4–2 K.S.	2–¾	..	5	5	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	23·0	800 / 1600	655
a.c.	**Euryalus** . shd.	12,000	440	69½	26¼	21,318 B.	Barrow .	Vickers .	1901	1904	782,901	6 K.S.	3–2	2	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M.	2	21·63 *t*	800 / 1600	755
b.	**Exmouth** . .	14,000	405	75½	26½	18,346 B.	Laird .	Laird .	1901	1903	1,032,409	7 K.S	2–1	1½ K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	19·0	900 / 2000	750
b.	**Formidable** .	15,000	400	75	26¾	15,000 B.	Portsm'th	Earle .	1898	1901	1,022,745	9 H.S.	3–2	2	12 H.S.	12–5	8 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·0	900 / 2000	750
b.	**Glory** . .	12,950	390	74	26	13,500 B.	Laird .	Laird .	1899	1901	841,014	6 H.S.	3–2	6 N.S.	12 H.S.	12–5 H.S.	5 H.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·25	800 / 1850	700
b.	**Goliath** . .	12,950	390	74	26	13,500 B.	Chatham.	Penn .	1898	1900	866,006											
a.c.	**Good Hope** . .	14,100	500	71	26	31,071 B.	Fairfield .	Fairfield .	1901	1902	990,759	6 K.S.	3–2	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2	23·5 *t*	1250 / 2500	900
a.c.	**Hampshire** .	10,850	450	68½	25	21,508 Y. & cyl.	Elswick .	Hawthorn.	1903	1905	866,527*	6–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	..	4 *7·5-in*, 6 *6-in.*, 2 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·47 *t*	800 / 1600	655
b.	**Hannibal** . .	14,900	390	75	27½	12,000	Pembroke	Harland .	1896	1897	906,799	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 / 2200	757
b.	**Hibernia** .	16,350	425	78	26¾	18,000 B.&W. & cyl.	Devonp'rt	Harland & Wolff	1905	1906	1,444,828*	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 16 *3-pr.*, & M.	4	19·0 / 19·01 *t*	950 / 2150	776
b.	**Hindustan**					18,521 B.&W. & cyl.	Clydeb'nk	J. Brown .	1903	1905	1,454,526*	9 K.S.	2–1	8–7	12 K.S.	12–6 N.S.	7 N.S.					
a.c.	**Hogue** . shd.	12,000	440	69½	26¼	21,432 B.	Barrow .	Vickers .	1900	1902	749,809	6 K.S.	3	2 H.S.	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	22·6 *t*	800 / 1600	755
t.	**Hood** . .	14,150	380	75	27½	13,000	Chatham	Humphrys	1891	1893	849,252	18 *comp.*	3	5 *comp.*	17 *comp.*	18–6 *comp.*	6–2	4 *13·5-in.*, 10 *6-in.*, 10 *6-pr.*, 12 *3-pr.*, 2 M., 2 l.	3	17·5	900 / 1800	730

* Total estimated cost of ship including guns.

† Turbine machinery of Parsons type.

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GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in	in.	in.			knots.	tons.	
b.	**Illustrious**	14,900	390	75	27½	12,000	Chatham	Penn	1896	1898	894,585	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 / 2200	757
b.	**Implacable**	15,000	400	75	26¾	15,000 B.	D'port	Laird	1899	1902	989,116	9 K.S.	3–2	2	12 K.S.	12–5 K.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18·0	900 / 2000	755
b.	**Irresistible**						Chatham	Maudslay	1898	1901	1,048,136											
a.c.	**Invincible**	17,250	530	78½	26	41,000	Elswick.	Humph'ys†	1907		1,756,925*	7–4 K.C.	..	..	..	8	..	8 *12-in.*	..	25	1000	..
a.c.	**Inflexible**						Clydeb'k	J. Brown †	1907	..	1,708,643*											
a.c.	**Indomitable**						Fairfield	Fairfield† .	1907		1,735,357*											
b.	**Jupiter** .	14,900	390	75	27½	12,000	Clydeb'nk	Thomson .	1895	1897	902,011	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 / 2200	757
a.c.	**Kent** . .	9800	440	66	24½	21,000 B.	Portsm'th	Hawthorn	1900	1903	700,283	4–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	24 *t*	800 / 1600	500
b.	**King Edward VII.**	16,350	425	78	26¾	18,138 B. & W. & cyl.	Devonp'rt	Harland .	1903	1905	1,473,245*	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 N.S.	7	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 16 *3-pr.*, M.	4	19·04 *t*	950 / 1200	776
a.c.	**King Alfred**	14,100	500	71	26	30,893 B.	Barrow .	Vickers	1901	1903	978,125	6-5-4 K.S.	2½–1	..	5 K.S.	6-5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 l.	2	23·46 / 23·28 *t*	1250 / 2500	813
	Leviathan .					31,203 B.	Clydeb'nk	J. Brown			1,012,959											
a.c.	**Lancaster** .	9800	440	66	24½	22,000 B.	Elswick .	Hawthorn	1902	1904	732,858	4–2 K.S.	2–¾		5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	23·0	800 / 1600	500

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b.	**London**	15,000	400	75	26½	15,000 B.	Portsm'th	Earle	1899	1902	1,036,393	9 K.S.	3–2	2	12 K.S.	12–5 K.S.	6	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 8 *3-pr.*, & M.	4	18·0	900 2000	755
b.	**Lord Nelson**	16,500	410	79½	27	16,750 B. & W.	Jarrow	Palmer	1906	1908	1,636,316*	12–6 K.C.		8	8	12	..	4 *12-in.*, 10 *9·2-in.*, 24 *12-pr.*, 5 *3-pr.*, 5 M.	5	18	900	865
b.	**Magnificent**	14,900	390	75	27½	12,000	Chatham	Penn	1894	1895	908,789											
b.	**Majestic**	14,900	390	75	27½	12,000	Portsm'th	Barrow	1895	1895	916,382	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 2200	757
b.	**Mars**	14,900	390	75	27½	12,000	Birkenh'd	Laird	1896	1897	902,402											
a.c.	**Minotaur**	14,600	490	74½	26	27,856 B. & W.	Devonp'rt	Harland & Wolff	1906	1908	1,438,065*	6–4	1–½	6	..	8	7	4 *9·2-in.*, 10 *7·5-in.*, 2 *12-pr.*, 30 *3-pr*, M.	5	23·01 *t*	1000	755
a.c.	**Monmouth**	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow Shipbg.Co.	1901	1903	979,591	4–2 K.S.	2–¾	4 K.S.	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	23·0	800 1600	500
a.c.	**Natal**	13,550	480	73½	27	23,592 Y² & Cyl.	Barrow	Vickers	1905	1906	1,218,244*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 2 *12-pr.*, 28 *3-pr.*, 2 M.	3	23·33 *t*	1000	704
b.	**New Zealand**	16,350	425	78	26¾	18,440 Nic. & Cyl.	Portsm'th	Humphrys	1904	1905	1,424,375*	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 K.S.	7	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 14 *12-pr.*, 16 *3-pr.*, M.	4	18·59 *t*	950 2150	776
t.	**Nile**	11,940	345	73	27½	12,000	Pembroke	Maudslay	1888	1890	890,283	20–16 *comp.*	3	3	18–14 *comp.*	18 *comp.*	..	4 *13·5-in.*, 6 *6-in.*, 22 *6-pr.*, *3-pr.*, & M.	3 (2 sub.)	16·7 *t*	900 1200	558
b.	**Ocean**	12,950	390	74	25½	13,500 B.	Devonport	Hawthorn	1898	1900	883,778	6 H.S.	2–1	6	12 H.S.	12–5 H.S.	5 H.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4 (4 sub.)	18·25	800 1850	700
b.	**Prince George**	14,900	390	75	27½	12,000	Portsm'th	Humphrys	1895	1896	895,504	9 H.S.	4–2½	9	14–9 H.S.	14–6 H.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 l.	5	17·5	900 2200	757
b.	**Prince of Wales**	15,000	400	75	26¾	15,000 B.	Chatham	Greenock Foundry	1902	1904	1,114,079											
b.	**Queen**	15,000	400	75	26¾	15,000 B. & W.	Devonport	Harland & Wolff	1902	1904	1,074,999	9 K.S.	2–1	3	12 K.S.	12–6 N.S.	6–2 K.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	4	18	900	755
b.	**Renown** shd.	12,350	380	72	26¾	12,000	Pembroke	Maudslay	1895	1896	709,706	8–6 H.S.	3–2	..	10–6 H.S.	10 H.S.	6–2	4 *10-in.*, 10 *6-in.*, 14 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5 (2 sub.)	18·0	900 1450	674

* Estimated cost of ship including guns.

† Turbine machinery.

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GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
												Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns	Torpedo Tubes.			
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b	**Ramillies** . .	14,150	380	75	27½	13,000	Glasgow	Thomson	1892	1893	902,600											
b	**Repulse** . .	14,150	380	75	27½	13,000	Pembroke	Humphrys	1892	1894	851,474											
b.	**Resolution** .	14,150	380	75	27½	13,000	Jarrow .	Palmer .	1892	1893	875,522											
b.	**Revenge** . .	14,150	380	75	27½	13,000	Jarrow .	Palmer .	1892	1895	876,101	18–5 *comp.*	3	5–4 N.S.	16 *comp.*	17 *comp.*	6–2 K.N.C.	4 *13·5-in.*, 10 *6-in.*, 16 *6-pr.*, 12 *3-pr.*, 2 M., 2 l.	3 (2 sub.)	17·5	900 / 1450	730
b.	**Royal Oak** .	14,150	380	75	27½	13,000	Birkenh'd	Laird .	1892	1894	899,272											
b.	**RoyalSovereign**	14,150	380	75	27½	13,000	Portsm'th	Humphrys	1891	1892	839,136											
a.c.	**Roxburgh.** .	10,850	450	68½	25	22,102 D. & cyl.	Glasgow	London & Glasgow Company	1904	1905	862,077*	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 *7·5-in.*, 6 *6-in.*, 2 *12-pr.*, 22 *3-pr.*, 2 M.	2	23·63 *t*	800 / 1600	655
b.	**Russell** . .	14,000	405	75½	26½	18,229 B.	Jarrow .	Palmer .	1901	1903	1,037,995	7 K.S.	2·1	1½ K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	19·3 *t*	900 / 2000	750
b.	**St. Vincent** .	19,250	500	84	27	24,500 B. & W.	Portsm'th	Scott's S.§	Bldg.	..	..	..	..	..	..	..	..	..	..	21	900	..
a.c.	**Shannon** . .	14,600	490	75½	25	28,553 Y^2	Chatham	Humphrys	1906	1908	1,423,410*	6–4	1–½	3	..	8	..	4 *9·2-in.*, 10 *7·5-in.*, 2 *12-pr.*, 30 *3-pr.*, & M.	5	22·49 *t*	950	755
a.c.	**Suffolk** . .	9800	440	66	24½	22,000 Nic.	Portsm'th	Humphrys	1903	1904	722,681	4–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	24·7 *t*	800 / 1600	500

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a.c.	**Sutlej**	shd.	12,000	440	69½	26¼	21,261 B.	Clydeb'nk	J. Brown	1899	1902	755,690	6 K.S.	3–2	..	5 K.S.	6 K.S.	5 K.S.	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	21·77 *t*	800 1600	755
b.	**Superb**		18,600	490	82	27	23,000 B. & W.	Elswick	Wallsend §	1907	..	1,692,131*	11 K.C.	..	..	11 K.C.	11 K.C.	..	10 *12-in.*, 24 *4-in.*	..	20·25	900	..
b.	**Temeraire**						23,000 Y³	Devonport	Hawthorn§	1907	..	1,743,643*											
b.	**Swiftsure**		11,800	436	71	24½	12,500	Elswick	Humphrys, Tennant	1903	1904	845,036	7	3	7	..	10	7 K.S.	4 *10-in.*, 14 *7·5-in.*, 14 *14-pr.*, 2 *12-pr.*, 12 *6-pr.*, & M.†	2	19·6 *t*	800 2000	700
b.	**Triumph**							Barrow	Vickers	1903	1904	845,479											
t.	**Trafalgar**		11,940	345	73	27½	12,000	Portsm'th	Humphrys	1887	1890	819,192	20–16 *comp.*	3	3	18–14 *comp.*	18 *comp.*	..	4 *13·5-in.*, 6 *6-in.*, 22 *6-pr.*, *3-pr.*, & M.	3 (2 sub.)	16·7 *t*	900 1200	572
b.	**Vanguard**		19,250**	500	54	27	24,500 B. & W.	Barrow	Vickers §	Bldg.	..	..	..	..	..	..	..	..	..	..	21	900	..
b.	**Victorious**		14,900	390	75	27½	12,000	Chatham	Hawthorn	1895	1897	885,212	9 H.S.	3–2½	9	14–9 H.S.	14–6 H.S.	6	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 8 M., 2 l.	5 (4 sub.)	17·5	900 2200	757
b.	**Venerable**		15,000	400	75	26¾	15,345 B.	Chatham	Maudslay	1899	1902	1,092,753	7 K.S.	4–2½	3	14 K.S.	11–6 K.S.	6–2	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 8 *3-pr.*, & M.	2	18·3 *t*	900 2000	755
b.	**Vengeance**		12,950	390	74	26	13,500 B.	Barrow	Vickers	1899	1901	836,417	6 H.N.S.	2–1	6	12 H.N.S.	12–6 H.S.	5 H.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 8 *3-pr.*, & M.	4	18·5	800 1850	750
a.c.	**Warrior**		13,550	480	73½	27	23,641 Y³ & cyl.	Pembroke	Wallsend	1905	1907	1,186,395*	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 2 *12-pr.*, 28 *3-pr.*, 2 M.	3	22·33	1000	704
	1 Battleship‡		Details not published.					Portsm'th															
	1 Armoured cruiser‡							Devonport															

* Total estimated cost of ship, including guns.
‡ Programme 1908–9.
† The Triumph carries only 8 6-pr., but has an additional torpedo tube.
§ Turbine machinery.
** Doubtful.

The battleships **Anson, Benbow, Camperdown, Devastation, Edinburgh, Howe, Rodney** and **Thunderer** have been struck out of the "fighting division of the Navy," but their armaments have not been removed, and they are shown in the official Navy List as available for "subsidiary purposes."

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GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.		Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
			tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
Scout. .	**Adventure** . .		2940	374	38¼	13½	15,850 Y mod.	Elswick .	Hawthorn.	1904	1905	270,263	2	¾	10 *12-pr.*, 8 *3-pr.* .		25·42 *t*	150	268
P. 3rd cl. Cr.	**Æolus** .	shd.	3600	300	43	17½	9000	Devonp'rt	Hawthorn.	1891	1893	213,180	2-1	2	2 *6-in.*, 6 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3 pr.*, M.	3	19·75	400 535	273
P. 3rd cl. Cr.	**Amethyst** . .		3000	360	40	14½	14,200 Y mod.	Elswick .	Parsons § .	1903	1905	228,426	..	..	12 *4-in.*, 11 *3-pr.*, M. .	2	23·42 *t*	300	296
P. 1st cl. Cr.	**Amphitrite**	shd.	11,000	435	69	25¼	18,000 B.	Barrow .	Vickers .	1898	1900	552,795	4	3-6 H. S.	16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·75	1000	677
P. 1st cl. Cr.	**Andromeda**	shd.	11,000	435	69	25¼	16,500 B.	Pembroke	Hawthorn.	1897	1900	574,916	3-6	3	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2	20·5	1000	600
P. 1st cl. Cr.	**Argonaut** .	shd.	11,000	435	69	25¼	18,000 B.	Fairfield .	Fairfield .	1898	1900	545,756	4	3-6 H. S.	16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·75	1000	677
P. 1st cl. Cr.	**Ariadne** .	shd.	11,000	435	69	25¼	18,000 B.	Clydeb'nk	J. Brown .	1898	1900	541,927							
P. 2nd cl. Cr.	**Arrogant** . .		5750	320	57½	21	10,000 B.	Devonp'rt	Earle .	1896	1898	279,248	1-2 N.S.	3 N.S.	10 *6-in.*, 9 *12-pr.*, 5 *3-pr.*, M.	2	19·6	500	480
P. 3rd cl. Cr.	**Astræa** .	shd.	4360	320	49½	19	9112	Devonp'rt	Devonport	1893	1894	254,217	2-1	3	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·75	400	312
Scout . .	**Attentive** . .		2940	374	38¼	13½	16,212 Y.	Elswick .	Hawthorn .	1904	1906	270,263	2	¾	10 *12-pr.*, 8 *3-pr.* .	2	25·88 *t*	150	268
P. 3rd cl. Cr.	**Barham** . .		1830	280	35	13½	4700 T.	Portsm'th	Hawthorn .	1889	1890	113,702	2-1	2	6 *4·7-in.*, 4 *3-pr.*, 2 M.	2	18·6	140	169

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P. 3rd cl. Cr.	**Boadicea** . .		3300	385	41	13½	18,000	Pembroke	J. Brown †	Bldg.	..	333,067*	..	..	3 *4-in.*‡ . . .	3	25	450	..
P. 3rd cl. Cr.	(New Ship) . .		3300	385	41	13½	..	Pembroke	..	Pro.	..	..	..	..	..	..	25	..	..
P. 3rd cl. Cr.	**Brilliant** .	shd.	3600	300	43¾	17½	9164	Sheerness	Hawthorn.	1891	1893	218,145	2–1	2	2 *6-in.*, 6 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M	3	19·7	400	273
P. 3rd cl. Cr.	**Cambrian** .	shd.	4360	320	49½	19	9000	Pembroke	Hawthorn.	1893	1894	244,725	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	3	19·5	400	312
P. 2nd cl. Cr.	**Challenger** .		5880	355	56	21¼	12,500 B.&W	Chatham	Wallsend Eng'ng Co.	1902	1904	360,194	..	..	11 *6-in.*, 9 *12-pr.*, 6 *3-pr.*, 2 M.	2	21·0	500	..
P. 3rd cl. Cr.	**Charybdis**	shd.	4360	320	49½	19	9000	Sheerness	Earle .	1893	1895	241,029	2–1	2	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
T. G. B .	**Circe** . .		810	230	27	8¾	5800 F.	Sheerness	Fairfield .	1892	1893	65,683	..	2	2 *4·7-in.*, 4 *3-pr.*	5	21·6	100	91
P. 2nd cl. Cr.	**Crescent** .	shd.	7700	360	60	23¾	12,000	Portsm'th	Penn .	1892	1894	392,453	5–1	6	1 *9·2-in.*, 12 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2 (1 sub.)	19·7	850	560
P. 1st cl. Cr.	**Diadem** .	shd.	11,000	435	69	26	16,500 B.	Fairfield	Fairfield .	1896	1899	554,863	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2 (1 sub.)	20·5	1000	357
P. 3rd cl. Cr.	**Diamond** . .		3000	360	40	14½	10,066 N. L.	Birkenh'd	Laird .	1904	1905	231,010	..	..	12 *4-in.*, 11 *3-pr.*, M.	2	22·17 *t*	300	296
P. 2nd cl. Cr.	**Diana** .	shd.	5600	350	54	21	9600	Fairfield	Fairfield .	1895	1898	253,009	2½	3	5 *6-in.*, 6 *4·7-in.*, 9 *12-pr.* 7 *3-pr.*, 5 M., 1 l.	3	19·5	550	470
„ „	**Dido** . .	shd.	5600	350	54	21	9600	Glasgow.	London and Glasgow Co.	1896	1898	254,190	2½	3	11 *6-in.*, 9 *12-pr.*, 7 *3-pr.*, 5 M., 1 l.	3 (2 sub.)	19·5	550	470
„ „	**Doris** .	shd.	5600	350	54	21	9600	Barrow .	Vickers .	1896	1898	256,306							

* Total estimated cost of ship including guns.

† Turbine machinery.

‡ Doubtful.

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GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P. 2nd cl. Cr.	**Eclipse** . shd.	5600	350	53	20¼	9600	Portsm'th	Portsm'th	1894	1897	276,313	1½–3	3	5 *6-in.*, 6 *4·2-in.*, 9 *12-pr.*, 8 *3-pr.*, M.	3	19·5	550	477
P. 2nd cl. Cr.	**Edgar** . .	7350	360	60	23¾	12,000	Devonp'rt	Fairfield .	1890	1893	410,980	5–1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	4	20·5	850	544
P. 2nd cl. Cr.	**Encounter** .	5880	355	56	20¼	12,500 Durr	Devonp'rt	Devonport Dockyard .	1903	1906	370,275	..	..	11 *6-in.*, 9 *12-pr.*, 8 *3-pr.*, 2 M.	2	20·75 to 21·0	600	..
P. 2nd cl. Cr.	**Endymion** .	7350	360	60	23¾	12,000	Hull	. Earle .	1891	1894	375,350	5–1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	20·5	850	544
P. 1st cl. Cr.	**Europa** . shd.	11,000	435	69	26	16,500 B.	Clydeb'nk	Thomson .	1897	1899	564,690	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2	20·5	1000	357
P. 3rd cl. Cr.	**Flora** . shd.	4360	320	49½	19	9000	Pembroke	Vickers .	1893	1895	242,276	..	..	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
„ „	**Forte.** . shd.	4360	320	49½	19	9000	Chatham	Chatham .	1893	1895	240,571	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 L.				
„ „	**Fox** . . shd.	4360	320	49½	19	9000	Portsm'th	Portsm'th	1893	1895	245,571							
P. Scout .	**Foresight** .	2945	360	39	14	14,277 T.	Fairfield	Fairfield .	1904	1905	285,672	1½–⅝	..	10 *12-pr.*, 8 *3-pr.* .	2	25·12 *t*	150	268
„ .	**Forward** .					15,018 T.					285,326					25·15 *t*	380	

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P. 2nd cl. Cr.	**Furious** . shd.	5750	320	57½	21	10,000 B.	Devonp'rt	Earle .	1896	1899	275,158	1-2	3	10 *6-in.*, 9 *12-pr.*, 3 *3-pr.*, 5 M., 1 l.	2	19·0	500	480
„ „ .	**Gladiator** . shd.					10,000 B.	Portsm'th	Maudslay .	1896	1900	287,604							
„ „ .	**Gibraltar** . shd.	7700	360	60	23½	12,000	Glasgow .	Napier .	1892	1894	373,236	5-1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	19·7	850	544
T. G. B. .	**Gossamer** . .	735	230	27	8¼	6000	Sheerness	Sheerness .	1890	1891	52,416	..	2	2 *4·7-in.*, 3 *4-pr.* .	2	20·0	100	91
P. 2nd cl. Cr.	**Grafton** . .	7350	360	60	23¾	12,000	Blackwall	Humphrys	1892	1894	372,890	..	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	20·0	850	560
T. G. B. .	**Halcyon** .	1070	250	30½	9	6000 L.W.R	Devonp'rt	Cammell Laird	1894	1895	75,206	..	2	2 *4·7-in.*, 5 *6-pr.* .	5	19·0	100	120
„ .	**Harrier** . .	1070	250	30½	9	3500	Devonp'rt	Hawthorn	1894	1895	73,036	..						
P. 2nd cl. Cr.	**Hawke** . .	7350	360	60	23¾	12,000	Chatham .	Fairfield .	1891	1893	400,702	5-1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2	20·0	850	544
T. G. B. .	**Hebe** . . .	810	230	27	8¾	3500	Pembroke	Fairfield .	1894	1894	77,322	..	2	2 *4·7-in.*, 5 *6-pr.* .	3	19·0	100	120
P. 2nd cl. Cr.	**Hermes** . shd.	5600	350	54	20½	10,000 B. & W.	Fairfield	Fairfield .	1898	1900 1902	281,776							
„ „	**Highflyer** shd.	5600	350	54	20½	10,000 B.	Fairfield	Fairfield .	1898	1900	280,182	1½-3	3	11 *6-in.*, 9 *12-pr.*, 8 *3-pr.*, 2 M.	2	20·0	600	477
„ „	**Hyacinth** . shd.	5600	350	54	20½	10,000	Glasgow .	London and Glasgow Co.	1898	1901	288,595							
P. 3rd cl. Cr.	**Hermione** shd.	4360	320	49½	19	9000	Devonp'rt	Thomson .	1893	1895	223,324	2-1	2	2 *6-in.*, 8 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	19·5	400	312
T. G. B. .	**Hussar** . .	1070	250	30½	9	3500	Devonp'rt	Hawthorn .	1894	1895	72,313	..	2	2 *4·7-in.*, 5 *6-pr.*, M. .	5	19·0	100	120

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GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P 3rd cl. Cr.	**Indefatigable** shd.	3600	300	43⅔	17½	9000	Glasgow .	London and Glasgow Co.	1891	1892	183,568	2–1	2	2 *6-in.*, 6 *4·7-in.*, 1 *12-pr*, 13 *6-pr.*, *3-pr.*, M.	3	19·75	400	273
P. 2nd cl. Cr.	**Isis** . . shd.	5600	350	54	21	9600	Glasgow .	London and Glasgow Co.	1896	1898	253,733	2½	3	11 *6-in.*, 9 *12-pr.*, 7 *3-pr.*, 5 M., 1 L.	3 (2 sub.)	19·5	550	470
„ „	**Juno** . shd.	5600	350	54	21	9600	Barrow .	Vickers .	1895	1898	256,106							
T. G. B. .	**Jason*** . .	810	230	27	8¾	5800 R.	Barrow .	Vickers	1892	1893 1902	50,161	..	2	2 *4·7-in.*, 4 *3-pr*, M. .	3	21·9 *t*	100	91
P. 3rd cl. Cr.	**Latona** .	3400	300	43	16½	9000	Barrow .	Vickers .	1890	1892	174,017	2	2–1	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 L.	3	20·0	400	273
T. G. B. .	**Leda*** . .	810	230	27	8¾	5800 T.	Sheerness	Penn .	1892	1894	62,789	2	..	2 *4·7-in.*, 4 *3-pr.*, M. .	5	21·8	100	91
P. 2nd cl. Cr.	**Minerva** . shd.	5600	350	53	20½	9600	Chatham.	Chatham .	1895	1897	275,331	1½-3	3	11 *6-in.*, 9 *12-pr.*, 8 *3-pr.*, 5 M.	2 (2 sub.)	19·5	550	437
P. 1st cl. Cr.	**Niobe** . shd.	11,000	435	69	26	16,500 B.	Barrow .	Vickers .	1897	1899	548,283	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 5 *3-pr.*, 2 M.	2 (2 sub.)	20·5	1000	600
T. G. B. .	**Niger** . .	810	230	27	8¾	6282 R.	Barrow .	Vickers .	1892	1894 1902	50,572	..	2	2 *4·7-in.*, 4 *3-pr.*, M. .	3	20·5 *t*	100	91
P. Scout .	**Pathfinder**	3000	370	38¾	14	17,176 L.N.	Birknhd.	Laird .	1904	1905	273,147	½–⅛	..	10 *12-pr.*, 8 *3-pr.* .	2	25·34 *t*	150	268
„ .	**Patrol** .					16,460					273,523					25·06 *t*	380	

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P. 3rd cl. Cr.	Pandora . .		2200	305	36¾	13½	7000 T.	Portsm'th	Portsm'th	1900	1901	165,218							
„ „	Pegasus . .		2135	300	36½	17	7000 R.	Jarrow .	Palmer .	1897	1899	134,919							
„ „	Pelorus . .		2135	300	36½	17	7000 Nor.	Sheerness	Thomson .	1896	1897	154,315							
„ „	Perseus . .		2135	300	36½	13½	7000 T.	Hull	Earle .	1897	1901	133,461							
„ „	Pioneer . .		2200	305	36¾	13½	7000 T.	Chatham.	Fairfield .	1899	1900	148,894	2	·22	8 *4-in.*, 8 *3-pr.*, 2 l. .	2	20·0	250 517	224
„ „	Prometheus .		2135	300	36½	13½	7000 T.	Hull .	Earle .	1898	1901	131,743							
„ „	Psyche . .		2200	305	36¾	17½	7000 T.	Devonp'rt	Devonport	1898	1900	156,890							
„ „	Proserpine .		2135	300	36½	17	7000 T.	Sheerness	Devonport	1896	1899	165,020							
„ „	Pyramus .		2135	300	36½	13½	7000 R.	Jarrow .	Palmer .	1897	1900	135,249							
„ „	Philomel . .		2575	265	41	15½	7500	Devonp'rt	Earle .	1890	1892	163,699	2–1	2	8 *4·7-in.*, 8 *3-pr.*, 4 M., 1 l.	2	19	300	217
P. 1st cl. Cr.	Powerful .	shd.	14,200	500	71	29	25,000 B.	Barrow .	Vickers .	1895	1898	705,335	3–6	6	2 *9·2-in.*, 16 *6-in.*, 16 *12-pr.*, 14 *3-pr.*, M.	4	22·1	1500 3000	840
P. 2nd cl. Cr.	Royal Arthur	shd.	7700	360	60	27¾	12,000	Portsm'th	Maudslay .	1891	1893	412,033	5–1	6	1 *9·2-in.*, 12 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2 (2 sub.)	19·7	850	567
P. 2nd cl. Cr.	St. George.	shd.	7700	360	60¾	23¾	12,000	Hull . .	Maudslay .	1892	1894	399,755	5–1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2 (2 sub.)	19·7	850	559
P. 3rd cl. Cr.	Sapphire . .		3000	360	40	14½	10,200	Palmer .	Palmer .	1904	1905	226,277	..	..	12 *4-in.*, 8 *3-pr.* . .	2	22·45 *t*	300	296
„ „	Sappho . .		3400	300	43	16½	9861	Poplar .	Penn	1891	1893	176,813	2–1	2	2 *6-in.*, 6 *4·7-in.*, 1 *12-pr.*, *6-pr.*, 13 *3-pr.*, M.	4	20·47	400	273
„ „	Scylla . .		3400	300	43	16½	9280	Poplar .	Penn .	1892	1893	176,655	2–1	2		4	20·62	400	273
P. Scout .	Sentinel . .		2940	360	40	14½	17,488 Nor. V.E.	Barrow .	Vickers .	1904	1905	276,837	1½–⅝	..	10 *12-pr.*, 8 *3-pr.* . .	2	25·07 *t*	150 410	268

* Re-engined and reboilered.

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GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
P. Scout .	Skirmisher .	2940	360	40	14¼	17,053 Nor.	Barrow .	Vickers .	1905	1905	276,579	1½–⅝	..	10 *12-pr.*, 8 *3-pr.* .	2	25·19	150	268
T. G. B. .	Skipjack . .	735	230	27	8¼	6000 R.	Chatham	Laird .	1889	1890 1899	61,102	..	2	2 *4·7-in.*, 5 *3-pr.* .	5	20·5	100	91
„ .	Speedwell .	735	230	27	8¼	6000 R.	Devonp'rt	Laird .	1889	1890 1899	60,837							
P. 1st cl. Cr.	Spartiate . shd.	11,000	435	69	26	18,658	Pembroke	Maudslay .	1898	1902	654,661	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2 (2 sub.)	21·0 *t*	1000	600
P. 3rd cl. Cr.	Sirius . shd.	3600	300	43¾	17½	9000	Elswick .	Maudslay .	1890	1892	190,991	2–1	2	2 *6-in.*, 6 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	4	19·75	400	273
T. G. B. .	Speedy . .	810	230	27	8¾	4703 T.	Chiswick	Thornycrft	1893	1894	61,638	..	2	2 *4·7-in.*, 4 *3-pr.* .	3	20·21	100	91
Special Des.	Swift. . .	1800	345	34⅛	10½	30,000	Birkenh'd	Cammell Laird	1907	..	250,292*	..	..	*4·4-in.*	..	36	180 Oil	
P. 2nd cl. Cr.	Talbot . shd.	5600	350	53½	21	9600	Devonpr't	Devonport	1895	1897	263,699	1½–3	3	5 *6-in.*, 6 *4·7-in.*, 9 *12-pr.*, 3 *3-pr.*, M.	3 (2 sub.)	19·5	550	433
P. 3rd cl. Cr.	Terpsichore .	3400	300	43	16½	9000	Glasgow .	Thomson .	1890	1892	176,616	2–1	2	2 *6-in.*, 6 *4·7-in.*, 1 *12-pr.*, 13 *6-pr.*, *3-pr.*, M.	3	20·0	400	275
P. 1st cl. Cr.	Terrible . shd.	14,200	500	71	27	25,000 B.	Glasgow .	Thomson .	1895	1898	708,619	3–6	6	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 8 *3-pr.*, 9 M., 2 *12-pr.* boat.	4	22·4	1500 / 3000	840
P. 2nd cl. Cr.	Theseus . .	7350	360	60	23¾	12,000	Blackwall	Maudslay .	1892	1894	370,359	5–1	6	2 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 19 *6-pr.*, *3-pr.*, M.	2 (2 sub.)	20·0	850	544

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P. 3rd cl. Cr.	**Topaze** . .		3000	360	40	14½	9860 L.N.	Birkenh'd	Laird .	1903	1905	242,444	..	..	12 *4-in.*, 11 *3-pr.*, M. .	2	22·1 *t*	300	296
P. 2nd cl. Cr.	**Venus** .	shd.	5600	350	54	21¼	9600	Fairfield .	Fairfield .	1895	1898	254,184	2½	3	11 *6-in.*, 9 *12-pr.*, 7 *3-pr.*, 4 M., 1 l.	3 (2 sub.)	19·5	550	470
„ „	**Vindictive** .		5750	320	54	20½	10,000 B.	Chatham	Chatham .	1897	1897	282,879	1–2 N.S.	3	10 *6-in.*, 9 *12-pr.*, *3-pr.*, 5 M., 1 l.	3 2	20·1	500	450
	5 cruisers* . .		4–5000	..	..	..	..	Contract	..	..	..	..	..	..	..	..	24–25	..	..

* Programme 1908–9.

River Gunboats.—**Robin, Nightingale, Snipe, Sandpiper** (1897), 85 tons; **Woodcock, Woodlark** (1898), 122 tons, 2 6-prs., 4 Maxims; **Kinsha** (1901), **Teal, Moorhen** (1902), 180 tons, 2 6-prs., 13 knots; **Widgeon** (1905).

The following vessels have been struck off the effective list, but the armaments have not in every case been removed:—*3rd Class Cruisers:* **Andromache, Apollo, Intrepid, Melampus. Naiad, Pique, Rainbow, Retribution, Spartan.** and **Tribune,** which were built under the Naval Defence Act; **Pomone** and **Pactolus** (completed 1900–1); **Medea** (re-engined and reboilered 1905). *Torpedo-Gunboats:* **Antelope** and **Onyx.** The following small craft have been placed on a "Special Service List" of "unprotected ships": **Sphinx, Lapwing, Redbreast** (East Indies), **Ringdove** (Fishery P.), **Dwarf** (W. C. Africa), **Shearwater** (British Columbia), **Bramble, Britomart, Clio,** and **Cadmus** (China).

The following vessels are employed on special service:—**Assistance** and **Cyclops,** fleet repair ships: **Blake, Blenheim, Hecla, Leander, Tyne,** and **Vulcan,** Torpedo Depôt Ships; **Bonaventure, Forth, Mercury, Thames** and **Hazard,** Submarine Depôt Ships; **Aquarius,** distilling vessel; and **Iphigenia** and **Thetis,** mine-laying vessels.

Royal Naval Reserved Merchant Cruisers.

——	Name.	Owners.	Length.	Breadth.	Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an annual subvention and permitted to fly the blue ensign.	**Mauretania** . . .	Cunard Co. . . .	785	88	33·6	38,000	68,000*	26·04* *t*
	Lusitania . . .	„ . . .	785	88	33·6	38,000	68,000*	25·40* *t*
	Campania . . .	„ . . .	610	65	26	12,950	30,000	21
	Lucania . . .	„ . . .	610	65	26	12,952	30,000	21
	Umbria . . .	„ . . .	501½	57	26	8,128	14,500	19½

* Results of trials on 1200 miles course. On other trials on 59 miles course Lusitania made 26·45 knots and Mauretania 26·17 knots.

In addition to the above, the Cunard Company holds all vessels, for the time being the property of the Company, at the disposal of His Majesty's Government for hire or purchase.

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ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.b.	**Almirante Brown**	4267	240	50	20½	4500	Poplar	1880	1882	270,000	9 *comp.*	1½	8 *comp.*	7 *comp.*	8 *comp.*	..	10 *5·9-in.* (Canet), 4 *4·7-in.*, 8 *2·4-in.*, 2 M.	2	13·75 *t*	650	350
a.c.	**Garibaldi**	6732	328	59⅝	24	13,384	Sestri Ponente	1895	1896	752,000	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.*	..	19·9 *t*	1000	500
a.c.	**General Belgrano**	7069	328	59⅝	24	13,000	Leghorn	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 14 *6-in.*, 2 *3-in.*, 10 *2·2-in.*, 8 *1·4-in.*, 2 L., 2 M.	4 sub.	20·1 *t*	1000	500
a.c.	**General San Martin**	6773	328	59⅝	24	13,000	Leghorn	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	4 *8-in.*, 10 *6-in.*, 6 *4·7-in.*, 12 *2·2-in.*, 10 *1·4-in.*, 2 L., 2M.*	4 sub.	19·8	1100	500
c.d.s.b.	**Independencia**	2336	230	44½	13	3000	Birkenhead	1891	1893	176,000	8 *comp.*	2	..	8 *comp.*	8 *comp.*	..	2 *9·4-in.*, 4 *4·7-in.* (A), 4 *3-pr.* (A), 4 M.	2	14·4 *t*	340	225
c.d.s.b.	**Libertad**	2336	230	44½	13	3000	Birkenhead	1890	1892	176,000											
a.c.	**Pueyrredon**	6773	328	59⅝	24	13,000 B.	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 *10-in.*, 10 *6-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.*	4 sub.	20·1 *t*	1000	500

* Garibaldi, General San Martin, General Belgrano and Pueyrredon have Armstrong guns.

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ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	**Buenos Aires** shd.	4780	396	47½	19	17,000	Elswick	1895	1895	383,000	..	4½	2 *8-in.* (A.), 4 *6-in.*, 6 *4·7-in.*, 16 *3-pr.*, 6 *1-pr.*	5	23·2* *t*	1000†	429
to.g.b.	**Espora**	520	210	25	8	3500	Birkenhead	1890	1891	..	..	..	3 *3-in.*, 4 *3-pr.*, 2 M.	5	20·0	100	124
cr.	**Nueve de Julio**	3570	354	44	19½	14,350	Elswick	1892	1892	293,000	4½	4½	4 *6-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 12 *1-pr.*	5	22·74 *t*	770†	300
cr.	**Patagonia**	1419	220	32¾	12¾	2400	Trieste	1885	1887	100,000	1½	4	1 *10-in.*, 3 *6-in.*, 6 l., 10 M.	5	13·0	350	210
to.g.b.	**Patria**	1070	250	31	10	4500	Birkenhead	1893	1894	87,000	..	..	2 *4·7-in.*, 4 *8-pr.*, 2 *3-pr.*, 2 M.	5	20·75 *t*	288	159
cr.	**25 de Mayo**	3200	325	43	16	13,800	Elswick	1890	1892	260,000	4½	4½	2 *8·2-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 12 *1-pr.*	6	22·43 *t*	600†	185
to.g.b.	**2 Unnamed**	1000	..	..	..	..	Elswick	Bldg.	..	..	..	..	2 *6-in.* Howitzers, 14 *12-prs.*, 5 M.	..	19·0	..	..

* Natural draught. † Bunker capacity.

The training-ship (cruiser) Presidente Sarmiento, 2750 tons, 2000 I.H.P. Niclausse boilers), and 13 knots speed, with 19 guns and three torpedo tubes; launched by Messrs. Laird, 1897. There are two old gun vessels, Paraná and Uruguay, 550 tons (1874), and several other small gunboats; also the torpedo-ram Maipù (1063 tons, 1750 I.H.P.), built in England in 1880. The Arno, Regina Margherita, Sempione, Pampa and Gaucho, converted merchant vessels.

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AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.b.	Arpád Babenberg	8208	354¼	65¾	23½	15,000 B.	Trieste	1901 1902	1903 1904	650,900 667,000	8½ K.S.	2½	4 K.S.	8 K.S.	8¼ K.S.	5 K.S.	3 *9·4-in.*, 12 *5·9-in.*, 10 *2·8-in.*, 8 M., 2 l.	2 (sub)	19·6 *t*	500 840	638
c.d.s.	Budapest	5462	305	55¾	21	9185 B.	Trieste	1896	1897	400,600	10½ H.S.	2½	3¼ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 12 *1·8-in.*, 6 M., 2 l.	4	17·8 *t*	500	450
b.	Erzherzog Friedrich					18,130 *t.*		1904	1906										20·56 *t*		
b.	Erzherzog Karl	10433	390½	72½	24½		Trieste			912,500	8½ K.S.	3	5 K.S.	8 K.S.	9¼ K.S.	7 K.S.	4 *9·4-in.*, 12 *7·5-in.*, 12 *2·8-in.*, 6 *1·8 in.*, 8 M., 2 l.	2 sub.	20·36 *t*	1315	..
b.	Erzherzog Ferdinand Max					18,000 Y.		1903 1905	1906 1907										20·0		
b.	Habsburg	8208	354¼	65¾	23½	15,000 B.	Trieste	1900	1902	626,000	8½ H.S.	2½	4 H.S.	8 H.S.	8¼ H.S.	5 H.S.	3 *9·4-in.*, 12 *5·9-in.*, 10 *2·8-in.*, 8 M., 2 l.	2 (sub)	19·6 *t*	500 840	638
a.c	Kaiserin Maria Theresia	5187	351	52½	21¼	9755	Trieste	1893	1895	304,187	4	2	..	4	4	4	2 *9·4-in.*, 8 *5·9-in.*, 14 *1·8-in.*, 6 M., 2 l.	4	19·0	740	502
a.c	Kaiser Karl VI.	6151	367½	56	20¼	12,800 B.	Trieste	1898	1900	429,000	10 H.S.	1½	6 H.S.	8 H.S.	8¾ H.S.	6 H.S.	2 *9·4-in.*, 8 *5·9-in.*, 16 *1·8-in.*, 4 M., 2 l.	4	20·7 *t*	800	535
b.	Kronprinz Rudolf (Ersatz)							Bldg.	..												
b.	Kronprinzessin Stephanie (Ersatz)	14500	430	82	..	20,000 Y.	Trieste	Bldg.	..	..	9 K.S.	2	6 K.S.	6 K.S.	10 K.S.	8 K.S.	4 *12-in.*, 8 *9·4*-in., 20 *3·9-in.*, 2 *3-pr.*, 2 M.	..	20·5	..	..
c.d.s.	Monarch	5550	305	55¾	21	8900	Pola	1895	1898	399,062	10½ H.S.	2½	3¼ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 12 *1·8-in.*, 6 M., 2 l.	4	17·4 *t*	500	450
a. c.	St. Georg	7185	383¾	61¾	21¼	15,270 *t*, Y.	Pola	1903	1906	581,583	8¼–6½ K.S.	1½	5 K.S.	7 K.S.	8¼–5¼ K.S.	6 K.S.	2 *9·4-in.*, 5 *7·5-in.*, 4 *5·9-in.*, 9 *2·8-in.*, 14 M., 2 l.	2 (sub)	22 *t*	1000	..
b.	Tegetthoff (Ersatz)	14500	430	82	..	20,000 Y.	Trieste	Bldg.	..	..	9 K.S.	2	6 K.S.	6 K.S.	10 K.S.	8 K.S.	4 *12-in.*, 8 *9·4-in.*, 20 *3·9-in.*, 2 *3-pr.*, 2 M.	..	20·5	..	..
c.d.s.	Wien	5550	305	55¾	21	8480	Trieste	1895	1897	397,850	10½ H.S.	2½ H.S.	3¼ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 12 *1·8-in.*, 6 M., 2 l.	4	17·6 *t*	500	450

Six armoured river monitors, Bodrog, Körös, Leitha, Maros, Szamos, and Temes, of 300–437 tons displacement. Kronprinz Rudolph (6830 tons) and Kronprinzessin Stephanie (5069 tons), launched 1887, are used as harbour-defence and barrack ships.

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AUSTRIA-HUNGARY.—Cruising Ships, &c.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
to. cr.	Aspern	2362	301¾	39½	14¼	7300 Y	Pola	1899	1901	155,000	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·0	470 500	289
to. g. b.	Blitz	354	193½	22¼	8	3500	Elbing	1888	1899	..	..	..	8 *1·8-in.*	4	21·0	250	59
cr. 2nd cl.	Kaiserin Elizabeth	4000	321½	47½	18½	8000	Pola	1890	1892	..	2¼	3½	2 *9·4-in.* (K.), 6 *5·9-in.* do., 13 *1·8-in.*, 4 M., 2 l.	5	19 0	660	418
cr. 2nd cl.	Kaiser Franz Josef I.	3966	321½	47½	18½	8000	Trieste	1889	1891	..	2¼	3½	2 *9·4-in.* (K.), 6 *5·9-in.* do., 16 *1·8-in.*, 2 l.	5	19·0	660	426
to. g. b.	Komet	354	193½	22¼	8	3500	Elbing	1888	1889	..	..	..	9 *1·8-in.*	4	21·0	50	59
cr. 3rd cl.	Leopard	1506	224	34	14	6000	Elswick	1886	1888	200,000	..	..	2 *4·7-in.*, 10 *1·8-in.*	4	18·3	250	186
to. g. b.	Magnet	502	220	26¾	8	5000 T	Elbing	1896	1899	51,052	..	..	6 *1·8-in.*	3	26·0 *t*	105	80
to. g. b.	Meteor	344	187	22¼	8	3500	Elbing	1887	1889	..	..	..	9 *1·8-in.*	4	23·1	120	59
cr. 3rd cl.	Panther	1506	224	34	14	6000	Elswick	1885	1887	..	..	..	2 *4·7-in.*, 10 *1·8-in*	1	18·5	250	186
T. D. S.	Pelikan	2431	279	39¼	15½	4600	Elbing	1891	1893	..	..	..	2 *5·9-in.* (K.), 8 smaller	4	18·0	..	198
to. g. b.	Planet	492	210	23	8¼	3500	Jarrow	1889	1890	..	..	..	2 *2·8-in.*, 8 *1·8-in.*	3	19·6	78	84
to. g.b.	Satellit	531	220	26¾	9¼	4000	Elbing	1893	1893	..	1½	..	1 *2·8-in.*, 8 *1·8-in.*	..	21·87	76	84
to. cr.	Szigètvár	2313	301¾	39½	14¼	7300 Y.	Pola	1899	1901	155,000	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·0	470 500	289
to. g. b.	Trabant	522	220	23	8¼	3500	Trieste	1890	1891	..	..	..	2 *2·8-in.*, 8 *1·8-in.*	3	20·0	..	84
to. cr.	Zara (Ersatz)*	3500	411	42	..	20,000 Y. tur.	Pola	Bldg.	..	..	1	..	7 *3·9-in.*, 2 M.	..	26·0	..	..
to. cr.	Zenta	2264	301¾	39½	12¼	7300 Y.	Trieste	1897	1899	143,780	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·9 *t*	470 500	289

* 2½ in. side armour and 2 in. bulkhead.

Four screw gunboats, between 540 and 870 tons displacement and 250 and 950 indicated horse-power.
Five patrol boats (30 tons, 2000 H.P.) have been completed for the Danube, two of them fitted with Parsons turbines.
Donau, training corvette, launched at Pola, 1893 (2307 tons).

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BRAZIL.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkheads.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in	in.	in.	in.			knots.	tons.	
t. River	**Maranhao**	463	137	34½	6½	700	Rio de Janeiro	1890	1892	..	5 H.S.	2	..	..	6	..	2 *4·7-in.*, 1 *2·5-in.*, 5 M.	..	12·0	..	..
c.d s., t.	**Marshal Deodoro**	3112	267½	48	13½	3400 D'A.	La Seyne	1898	1900	..	13¾–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 *9·4-in.*, 2 *5·9-in.* howitzers, 4 *4·7-in.*, 2 M., 4 *6-pr.*, 2 *1-pr.*	2 (sub.)	15·0	236	200
c.d.s., t.	**Marshal Floriano**							1899	1901												
b.	**Minas Geraes**	19,000	..	..	..	..	Elswick	Bldg.	..	..	..	..	..	..	..	..	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*	4	21·0	..	..
b.	**Rio de Janeiro**																				
t. River	**Pará**	463	137	34½	6½	700	Rio de Janeiro	1890	1892	..	5 H.S.	..	..	..	..	..	2 *4·7-in.*, 1 *2·5-in.*, 5 M.	..	12·0	..	..
t. River	**Pernambuco**	463	137	34½	6½	700	Rio de Janeiro	1905	Bdg.	..	5 H.S.	2	..	..	6	..	2 *4·7-in.*, 1 *2·5-in.*, 5 M.	..	12·0	..	..
t.	**Riachuelo** shd.	5700	305	52	19½	7300	Poplar	1883 1895	1888	365,000*	11 *comp.*	2	..	10 *comp.*	10 *comp.*	..	4 *9·2-in.* (Whitworth, altered by Armstrong), 6 *4·7-in.*, *23-pr.*, 15 M.	5	16·71	800	450
b.	**São Paulo**	19,000	..	..	..	..	Barrow	Bldg.	..	..	..	..	..	..	..	..	12 *12-in.*, 22 *4·7-in.*, 8 *3-pr.*	4	21·0	..	..

* Exclusive of guns and ammunition.

Two Monitors, 335 tons.

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BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
cr.	**Almirante Tamandare** shd.	4660	294	46	18¼	7500	Brazil .	1890	1893	..	1½	3	10 *6-in.*, 2 *4·7-in.*, 8 M. .	8	17·0	750	450
,,	**Andrada** . . . shd.	2559	252⅜	34	18	3600	Bergen . .	1890	1892	..	..	..	2 *4·7-in.*, 2 *14-pr.*, 6 *6-pr.*, 6 *1-pr.*	5	17·0	..	300
,,	**Bahia**	3000	..	..	..	tur.	Elswick .	Bldg.	..	..	..	..	10 *4·7-in.*, 8 *1·8-in.*	2	26·5	..	..
,,	**Barroso** . . . shd.	3600	330	43⅜	16¾	7500	Elswick .	1896	1897	..	3	4½ shields	6 *6-in.*, 4 *4·7-in.*, 10 *6-pr.*, 4 *1-pr.*, 4 M.	3	20·0	700	300
,,	**Benjamin Constant** . shd.	2707	236	46	18	2800	La Seyne .	1892	1894	..	2	..	4 *6-in.*, 8 *4·7-in.*, 8 M., 4 1.	4	14·0	260	287
to.cr.	**Caramuru**	1014	249½	30¾	10¼	6000	Kiel . .	1896	1897	..	½	..	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*	3	22·5	..	..
to.g.b.	**Gustavo Sampaio** . .	500	197	21	7¾	2500	Elswick .	1893	1894	..	..	..	2 *20-pr.*, 4 *7-pr.* . .	3	18·0	150	95
cr.	**Quinze de Novembro**	1300	210	35	13	750	Elswick. .	1892	1894	..	2–1	..	6 *4·7-in.*, 4 *6-pr.*, 6 M. .	4	17·0	170	160
,,	**Rio Grande do Sul** . .	3000	..	..	..	tur.	Elswick .	Bldg.	..	..	..	..	10 *4·7-in.*, 8 *1·8*-in.	2	26·5	..	..
to.cr.	**Tamoyo**	1063	269	28¾	9¾	6500	Kiel . .	1898	1900	..	..	4½ shields	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	23·0	293	110
,,	**Timbira**	1014	249½	30¾	10¼	7000	Kiel . .	1896	1897	..	½	4½ shields	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	22·5	250	110
g.v.	**Tiradentes** . . . shd.	800	165	30	11	1200	Elswick .	1892	1893	..	..	..	4 *4·7-in.*, 3 *6-pr.*, 4 M. .	2	14·5	110	107
to.cr.	**Tupy**	1014	249½	30¾	10¼	7000	Kiel . .	1896	1897	..	½	4½ shields	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	22·5	250	110

Eleven screw gunboats, 200 tons to 400 tons, and four 12-knot river gunboats built at Poplar. Two river gunboats built by Messrs. Yarrow were sent out in sections, 1907.

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CHILI.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
a.c.	**Almirante O'Higgins** shd.	8500	411½	62½	22	16,000 B.	Elswick .	1897	1898	..	7–5	2	..	..	7½–6	6	4 *8-in.*, 10 *6-in.*, 4 *4·7-in.*, 10 *12-pr.*, 10 *6-pr.*, 4 M.	3 (2 sub.)	21·5 *t*	1260	..
b.	**Capitão Prat** . . shd.	5981	328	60¾	21⅜	12,000	La Seyne	1890	1893	391,000	12	3	4	..	10½	2	6 *9·4-in.* (Canet), 8 *4·7-in.* (Canet), 6 *2·2-in.*, 4 *1·8-in.*, 10 *1·4-in.*, 5 M.	4	18·3 *t*	775	485
a.c.	**Esmeralda** . . .	7020	436	53½	22¼	16,000	Elswick .	1896	1897	..	6 H.S.	2	..	6 H.S.	4½ Shields	..	2 *8-in.*, 16 *6-in.*, 8 *12-pr.*, 2 *3-pr.*, 4 M.	3 (2 sub.)	22·8 *t*	1350	500

Cruising Ships, &c.

Class.	NAME	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
to.g.b.	**Almirante Condell** . }	750	240	27½	10½	{4500 B.}	Birkenhead .	1890	1892	..	..	..	3 *14-pr.*, 4 *3-pr.*, 2 M. .	5	21·0	210	..
,,	**Almirante Lynch** . }																
,,	**Almirante Simpson**. .	812	240	27½	10½	4700 N.	Birkenhead .	1896	1896	..	..	4½	2 *4·7-in.*, 4 *3-pr.* . .	3	21·0*t*	200	..
or.	**Blanco Encalada** . shd.	4400	370	46½	18½	14,500	Elswick . .	1893	1894	..	4–1⅜	..	2 *8-in.*, 10 *6-in.*, 12 *3-pr.*, 10 *1-pr.**	5	22·78 *t*	†900	427
,,	**Chacabuco** . . shd	4500	360	46	18‡	15,750	Elswick . .	1901	1903	..	4½–1⅜	..	2 *8-in.*, 10 *4·7-in.*, 16 *1·8-in.*, 2 M., 1 l.	5	23·0	1000 †	..
,,	**General Baquedano** (Training)	2330	240	45¾	18‡	1500 B.	Elswick . .	1898	1900	..	..	..	4 *4·7-in.*, 2 *12-pr.*, 2 *6-pr.*, 2 M., 1 l.	1	13·7 *t.*	200 300	302
,,	**Ministro Zenteno** . shd.	3600	330¼	43¾	16¾	6500	Elswick . .	1896	1898	..	..	..	8 *6-in.*, 10 *6-pr.*, 4 *1-pr.** .	3	20·0*t*	800	..
,,	**Presidente Errázuriz** shd.	2047	268	35¾	19½	5400	La Seyne .	1890	1892	..	3½	..	4 *6-in.* (Canet), 2 *5-in.*, 4 *2·2-in.*, 6 M.	3	19·0	200	171

* Armstrong. † Bunker capacity. ‡ Mean draught.

Two Gunboats of 145 tons displacement and one of 180 tons.

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CHINA.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.						in.	in.			kts.	tons.	
cr.	**Foo-Ching**	2500	253	36¼	18	2400	..	1893	1895	..	4–2	4½	3 *5-in.* (K.), 4 M., 2 l.	..	16·0	..	..
to.g.b.	**Fei-Ying**	837	257¼	28½	12½	4500 Y.	Stettin	1895	1895	..	..	2	2 *4-in.*, 6 *3·4-in.*, 4 smaller	3	21·8 *t*	75	90
cr.	**Hai-Chi.**	4300	396	46¾	18½	17,000	Elswick	1898	1899	..	5	6	2 *8-in.*, 10 *4·7-in.*, 12 *3-pr.*, 4 *1·4-in.*, 6 M.	5	24·0	300	374
„	**Hai-Shen**	2903	314¾	41	16	8000	Vulcan	1898	1898	..	3	2	3 *6-in.* (K.), 8 *4-in.*, 6 *1·4-in.* Hotchkiss, 6 M.	3 (1 sub.)	20·7 *t*	220 500	244
„	**Hai-Shew**						Stettin	1897	1898								
„	**Hai-Yung**							1897	1898								
„	**Hi-Ying**	2165	253	36¼	18	2400	..	1895	1897	..	..	..	2 *8-in.* (A.), 8 *4·7-in.*, 4 M.	1	21·0	..	..
to.cr.	**Kien-Wei**	861	256	26½	10½	7000 N.S.	Foochow	1900	1902	..	..	..	1 *3·9-in.*, 3 *2·5-in.*, 6 *1·4-in.*	2	22·5	360	300
„	**Kien-Gnan**						Foochow	1899	1902	..	..	..					
cr.	**King-Ching**	2100	250	36	20	2400	..	1886	1888	..	..	..	3 *7-in.* (K.), 7 *40-pr.*, 6 M.	2	14·5	360	300
to.g.b.	**Kwang-Ting**	1000	235	27½	11¼	3400	..	1890	1892	..	..	..	3 *4·7-in.*, 4 M., 2 l.	4	16·0	..	120
g.b.	**Tchu-Tai**	552	..	..	..	..	Kobe	1906	..	..	..	..	2 *4·7-in.*, 2 *12-pr.*	..	13·0	..	..

Torpedo-gunboat Pei-Ting (349 tons), four gunboats of 411 tons, two of 300 tons, four of 215 tons (defence of Canton Roads), training vessel Tung-Chi, 1700 tons—all launched 1885–88.
Six river gunboats (752 tons) and one smaller have been built in Japan.

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DENMARK.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s., t.	**Herluf Trolle** .	3415	271	50	16½	4200 T.	Copenhagen	1899	1901	..	8–4 H.S.	2	7 H.S.	..	6 H.S.	6 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·2-in.*, 8 smaller.	3 (sub.)	16·0	250	250
b.	**Iver Hvitfeldt** .	3208	242	49½	18	5100	Copenhagen	1886 1900	1889	200,000	12	2	..	9½	8	..	2 *10·2-in.* (K.), 10 *6-pr.*, 8 M.	4	15·6	250	298
c.d.s., t.	**Olfert Fischer**	3415	271	59	18¾	4200	Copenhagen	1903 Bldg.	1905 ..	..	8–4 K.S.	..	7 K.S.	..	6 K.S.	..	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·2-in.*, 8 smaller.	3 (sub.)	16·0	250	250
c.d.s., t.	**Peder Skram**																				
c.d.s., t.	**Skjold** . .	2115	226½	38	13½	2200 T.	Copenhagen	1896	1899	..	9	2	..	7	8	4½	1 *9·4-in.*, 3 *4·7-in.* (K.), 4 *1·8-in.*, 1 M.	4	13·0	280	210

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.				tons.	
3rd cl. *cr.*	**Geiser** . . .	1260	257½	27½	11¼	3000 T.	Copenhagen .	1892	1893	..	1½	..	2 *4·7-in.*, 4 *3·4-in.*, 6 M. .	4	17·1 *t*	125	155
„	**Heimdal** . .	1260	257½	27½	11¼	3000 T.	Copenhagen .	1894	1896	..	1½	..	2 *4·7-in.*, 4 *3-pr.*, 6 M. .	4	17·5	125	155
„	**Hekla** . . .	1260	233	32¾	11¼	3000 T.	Copenhagen .	1890	1893	..	1½	..	2 *6-in.*, 4 *2·2-in.*, 6 M. .	4	17·0	125	155
cr. .	**Valkyrien** . .	2854	268	43½	18	5300	Copenhagen .	1887 1896	1890	..	2½	..	2 *8·2-in.* (K.), 6 *5·9-in.*, 4 Q.F., 10 M.	5	17·0	450	300

Gunboats.—Six (*Falster, Lille Belt, Öresund, Store Belt, Grönsund, Guldborgsund*), of 150 to 240 tons, 200 to 400 I.H.P. *Ebern Snare* (torpedo school-ship), 530 tons, 2-in. belt. *Hjaelperen* (mining), 280 tons. *Beskytteren*, torpedo transport, 389 tons, 600 I.H.P., B. & W. boilers, 3 1·8-in. Q.F., launched 1900.

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FRANCE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.g.b.	**Achéron** . .	1693	181	40½	11¾	1700	Cherbourg.	1885 1900	1887	100,000	9½–6 *comp.*	2½	..	..	8 *comp.*	..	1 *10·8-in.*, 3 *3·9-in.*, 2 *1·8-in.*, 4 M.	..	13·0	100	101
a.c.	**Aube (Amiral)** .	9856	453	66¼	24½	22,155 *t* B.	St. Nazaire	1902	1904	973,440	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 20 small Q.F. and M.	2 (sub.)	21·9 *t*	970 1590	615
t.	**Bouvet** . .	12,007	401¼	70¼	27½	14,000 B.	Lorient .	1896	1898	1,100,770	15¾–8 H.S.	3½	4 H.S.	..	14½ H.S.	4 H.S.	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 8 *3·9-in.*, 19 small Q.F. and M.	2 (sub.)	18·2 *t*	621	621
t.	**Bouvines** .	6691	293¾	58¼	23¼	8400 A'D.	La Seyne .	1892	1894	594,640	17¾	4	..	..	14½	..	2 *12-in.*, 8 *3·9-in.*, 4 *1·8-in.*, 10 *1·4*-in. M.	2	16·05 *t*	300	323
t.	**Brennus** . .	11,190	361	67	26¼	14,000 B.	Lorient .	1891	1895	991,767	15¾ *comp.*	4	4¾ *comp.*	..	17¾ *comp.*	4¾ *comp.*	3 *13·4-in.*, 10 *6·4-in.*, 23 small Q.F. and M.	4	17·1 *t*	800	696
a.c.	**Bruix** . .	4735	365¼	46	19¾	9049 B.	Rochefort .	1894	1896	409,622	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 4 *1·4-in.*, M.	4	18·3 *t*	406	391
t.	**Caïman** . .	7050	278½	59	24½	6000	Toulon .	1885 1892	1887	..	19½	3	..	..	10 H.S.	..	2 *10·8-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*, 2 M.	2 (sub.)	14·5 *t*	400 800	332
t.	**Carnot** . .	11,954	382¼	70½	27¼	16,300 *t* D'A.	Toulon .	1894	1896	1,070,088	17¾–9 *comp.*	2¾	4	..	14½	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 16 *1·8-in.*, 10 *1·4-in.*, and M.	2 (sub.)	17·86 *t*	705	625
t.	**Charlemagne** .	11,108	385½	66½	27½	14,500 B.	Brest .	1895	1898	1,096,432	15¾ H.N.	3½	3 H.N.	..	15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	2 (sub.)	18·1 *t*	680 1100	631
t.	**Charles Martel.**	11,693	392½	71	27½	14,996 *t* D'A.	Brest .	1893	1897	1,092,830	17¾	3½	4	..	15¾	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 14 *1·8-in.*, 5 *1·4-in.*	2 (sub.)	18·1 *t*	677	632
a.c.	**Charner** (Amiral)	4702	348	46	19¼	8300 B.	Rochefort .	1893	1895	353,200	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *6·5-in.* 14 small Q.F. and M.	4	18·2 *t*	413	375

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FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Condé** . .	9856	453	63¾	24½	22,175 Nic.	Lorient .	1902	1904	863,799	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·4 *t*	970 1590	615
t.	**Condorcet.** .	17,710	476	84	27	22,500 tur.	St. Nazaire	Bldg.	..	2,000,824	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12 pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·0	960 2010	681
t.	**Danton** . .	17,710	476	84	27	22,500 tur.	Brest .	Bldg	..	1,803,224	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·0	960 2010	681
t.	**Démocratie** .	14,635	438¾	79½	27½	19,190 B.	Brest .	1904	1907	1,473,180	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·44 *t*	905 1825	793
a.c.	**Desaix** . shd.	7578	426½	58¼	24¼	17,715 *t* B.	St. Nazaire	1901	1903	762,759	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·7 *t*	880 1200	531
t.	**Diderot** . .	17,710	476	84	27	22,500 tur.	St. Nazaire	Bldg.	..	2,000,824	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·0	960 2010	681
a.c.	**DupetitThouars**	9367	452¾	63¾	24½	22,000 *t* B.	Toulon .	1901	1905	831,839	6 H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	3¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	22·5 *t*	1020 1600	610
a.c.	**Dupleix** . shd.	7578	426½	58¼	24¼	17,100 B.	Rochefort .	1900	1903	652,354	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·0	880 1200	531
a.c.	**Dupuy de Lôme**	6676	374	51½	26¾	14,000 N.S.	Brest .	1890	1893	416,000	4	2	4	..	4	4	2 *7·6-in.*, 6 *6·4-in.*, 12 *2·5-in.* and *1·8-in.*, 8 M.	4	20·0	900	515
a.c.	**Edgard Quinet**	13,780	515	70¼	27½	36,000 B.	Brest .	1907	..	1,307,536	6½–3½ K.S.	2½–1¼	5–2 K.S	4¾ K.S.	8 K.S.	4¾ K.S.	14 *7·6-in.*, 16 *2·4-in.*, 8 *1·4-in.*, 2 smaller.	2 (sub.)	23·0	1242 2300	738
a.c.	**Ernest Renan** .	13,427	515	70½	26¾	36,000 Nic.	St. Nazaire	1906	..	1,410,000	6¾–4 H.S.	2	5–3 H.S.	4¾	6 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.* 16 *9-pr.*, 8 *3-pr.*	2 (sub.)	23·5	1354 2300	674

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t.	**Gaulois** . .	11,105	385½	66½	27½	14,500 B.	Brest .	1896	1898	1,093,925	15¾ H.N.	3½–1½	3 H.N.	..	15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	2 (sub.)	18·0	680/1100	632
a.c.	**Gloire** . .	9856	453	63¾	24½	20,500 Nic.	Lorient .	1900	1904	883,269	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	970/1590	615
a.c.	**Gueydon** . . (Amiral)	9367	459	63¾	24½	20,200 Nic.	Lorient .	1899	1902	817,994	6–3¾ H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	3¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	1020/1600	610
t.	**Henri IV.** .	8807	354½	72	23	11,500 Nic.	Cherbourg.	1899	1903	801,248	11–7 H.S.	3	4¾ H.S.	..	11¾ H.S.	5 H.S.	2 *10·8-in.*, 7 *5·5-in.*, 12 *1·8-in.*, 2 M.	2 (sub.)	17·2 *t*	735/1100	464
t. & b.	**Hoche** . .	10,581	333	65½	27½	11,300 B.	Lorient .	1886 1900	1889	700,000	18–14 H.S.	3	3	..	16 *comp.*	.	2 *13·4-in.*, 2 *10·8-in.*, 12 *5·5-in.*, 4 *2·5-in.*, 9 *1·8-in.*, 12 *1·4-in.*, 8 M.	5	16·0	800	660
t.	**Indomptable** .	7105	279¾	59	23½	6605 Nic.	Lorient .	1883 1902	1886	..	19½ *comp.*	3	..	..	10 H.S.	..	2 *10·8-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*, 2 M.	4	14·8 *t*	400/800	332
t.	**Jauréguiberry** .	11,637	364	72¾	27¾	15,800 D'A.	La Seyne .	1893	1896	1,069,536	17¾	2¾	4	..	14½	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 12 *1·8-in.*, 8 *1·4-in.*, 8 M.	2 (sub.)	18·07 *t*	700	625
a.c.	**Jeanne d'Arc** .	11,092	477¼	63¾	26½	28,000 Guyot	Toulon .	1899	1903	875,847	6–3 H.S.	2·2	3 H.S.	..	6 H.S.	5 H.S.	2 *7·6-in.*, 14 *5·5-in.*, 16 *1·8-in.*, 8 *1·4-in.*, 2 M.	2 (sub.)	21·7 *t*	1400/2000	626
c.d.s.	**Jemmapes** .	6474	284	57¾	22	9250 D'A.	St. Nazaire	1892	1894	525,000	17¾–10	4–2¾	..	..	17¾	..	2 *13·4-in.*, 4 *3·9-in.*, 4 *1·8-in.*, 10 *1·4-in.*, M.	2	16·7 *t*	300	334
a.c.	**Jules Ferry** .	12,351	480½	70¼	27	28,753 Guyot	Cherbourg	1903	1906	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	6 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	22·8 *t*	1320/2100	728
a.c.	**Jules Michelet.**	12,370	480½	70¼	27	29,000 Guyot	Lorient .	1905	..	1,204,107	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·4-in.*, 24 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	23·0	1320/2100	724
t	**Justice** . .	14,635	438¾	79½	27½	18,548 Nic. *t.*	La Seyne .	1904	1907	1,670,385	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·43 *t*	905/1825	793
a.c.	**Kléber** . shd.	7578	426½	58¼	24¼	18,000 Nic.	Bordeaux .	1902	1903	770,320	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·2 *t*	880/1200	531
a.c.	**Latouche - Tréville**	4681	348	46	19½	8300 B.	Havre .	1892	1893	360,000	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 6 *1·4-in.*, M.	4	18·2 *t*	406	375

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FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
a.c.	**Léon Gambetta**	12,351	480½	70½	27	27,500 Nic.	Brest	1901	1904	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	23·06 K.	1320 2100	728
t.	**Liberté**	14,635	434¾	79½	27½	20,565 B. *t.*	St. Nazaire	1905	1907	1,652,436	11 H.S.	..	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·31 *t*	905 1825	793
b	**Marceau**	10,558	330	65½	27¼	14,000 Nic.	La Seyne	1887 1901	1890	769,080	18	3	..	..	16	2 screen.	4 *13·4-in.*, 17 *5·5-in.*, 4 *2·5-in.*, 12 *1·8-in.*, 8 M.	6	16·4 *t*	800	660
a.c.	**Marseillaise**	9856	453	63¾	24½	20,500 B.	Brest	1900	1903	881,270	6-4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 2 *2·5-in.*, 18 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	970 1590	615
t.	**Masséna**	11,735	384¾	66	27	13,500 D'A.	St. Nazaire	1895	1898	1,100,400	17¾–9¾	3½	4 H.S.	16	15¼ 15¾ H. S.	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 8 *3·9-in.*, 12 *1·8-in.*, 12 *1·4-in.*	2 (sub.)	17·1 *t*	630	642
t.	**Mirabeau** shd.	17,710	476	84	27	22,500 tur.	Lorient	Bldg.	..	1,803,224	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·0	960 2010	681
a.c.	**Montcalm**	9367	452¾	63¾	24½	19,600 N.S.	La Seyne	1900	1902	902,809	6 H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	2¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	1020 1600	612
t.	**Patrie**	14,635	438¾	79½	27½	17,859 *t* Nic.	La Seyne	1903	1906	1,674,870	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 18 *6·4-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·12 *t*	905 1825	793
a.g.b.	**Phlégéton**	1767	187	40¼	11¾	1700	Cherbourg	1890	1892	142,000	9–6 *comp.*	2	..	..	8 *comp.*	..	1 *10·8-in.*, 1 *5·5-in.*, 4 *1·8-in.*, 4 M.	..	12·4 *t*	72	101
a.c.	**Pothuau**	5374	370½	50½	21	10,398 B.	Havre	1895	1896	384,000	3½–2	3⅜	2½	..	9½	5½	2 *7·6-in.*, 10 *5·5-in.*, 16 *1·8-in.*, 8 *1·4-in.*	4	19·2 *t*	538	461
t	**République**	14,635	438¾	79½	27½	19,626 *t* Nic.	Brest	1902	1906	1,523,136	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 18 *6·4-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·15	905 1825	793

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b.	**Requin** . .	7078	279¾	59	24½	7000 Nic.	Bordeaux .	1885 1902	1888	..	19½ *comp.*	3	..	..	10 H.S.	..	2 *10·8-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*, 12 M.	4	15·0	400 800	332
t.	**Saint Louis** .	11,090	385½	66½	27½	14,500 B.	Lorient .	1896	1900	1,080,997	15¾ H.N.	3½	3 H.N.	..	3–15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	2 (sub.)	18·0	820 1150	631
a.g.b.	**Styx** . .	1767	187	40¼	11¾	1700	Cherbourg	1892	1893	142,000	9–6 *comp.*	2	..	..	8 *comp.*	..	1 *10·8-in.*, 1 *5·5-in.*, 4 *1·8-in.*, 4 M.	..	13·0	72	101
t.	**Suffren** . .	12,527	411¾	70¼	27½	16,500 Nic.	Brest .	1899	1903	1,195,564	12–8 H.S.	2¾	5–3 H.S.	..	12 H.S.	6–5 H.S.	4 *12-in.*, 10 *6·4-in.*, 8 *3·9-in.*, 20 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	18·0	1100 1820	615
t.	**Tréhouart** .	6671	293¼	58½	23¼	8500 B.	Lorient .	1893	1896	593,100	17¾	4	..	..	14½	..	2 *12-in.*, 8 *3·9-in.*, 4 *1·8-in.*, 4 *1·4-in.*, 8 M.	2	15·76 *t*	300	337
o.d.s.	**Valmy** . .	6477	293¾	57¼	23¼	8954	St. Nazaire	1892	1895	578,957	17¾	4	..	..	17¾	..	2 *13·4-in.*, 4 *3·9-in.*, 4 *1·8-in.*, 10 M.	2	16·7 *t*	300	297
t.	**Vergniaud** .	17,710	476	84	27	22,500 tur.	Bordeaux .	Bldg.	..	2,000,824	10–8 K.S	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub)	19·0	960 2010	681
t.	**Vérité** . .	14,635	438¾	79½	27½	20,433 *t* B.	Bordeaux .	1907	1908	1,661,409	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	19·26 *t*	905 1825	822
a.c.	**Victor Hugo** .	12,351	480½	70¼	27	28,486 *t* B.	Lorient .	1904	1906	1,229,932	6¾–4 H S.	2	5–3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	2 (sub.)	22·5 *t*	1320 2100	728
t	**Voltaire** . .	17,710	476	84	27	22,500 tur.	La Seyne .	Bldg.	..	2,000,824	10–8 K.S.	2¾	8¾	..	12 K.S.	8¾ K.S.	4 *12-in.*, 12 *9·4-in.*, 16 *12-pr.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	19·0	960 2010	681
a.c.	**Waldeck-Rousseau** .	13,780	515	70¼	27½	36,000 Nic.	Lorient .	1908	..	1,301,380	6½–3½	2½	5	4¾	6	5½	14 *7·6-in.*, 16 *2·4-in.*, 8 *3-pr.*, 2 *1-pr.*	2 (sub.)	23·0	1242 2300	738

Six battleships of 20,000 tons are proposed by the Superior Council of the Navy.

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FRANCE.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Alger** . . .	4313	346	45½	19½	8254 B.	Cherbourg .	1889	1893	280,000	3½	..	4 *6·4-in.*, 6 *5·5-in.*, 10 smaller, 10 M.	5	19·61 *t*	860	325
to. g. b. .	**Casabianca** . .	974	262½	26¾	11½	5200 D'A.	Bordeaux .	1895	1896	98,985	½	..	1 *3·9-in.*, 3 *2·5-in.*, 5 *1·8-in.*, 4 *1·4-in.*	2	22·0 *t*	116	143
3rd cl. *cr.*	**Cassard** . . .	3890	325½	45	20½	10,143 D'A.	Cherbourg .	1896	1898	318,712	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 3 *1·4-in.*, 2 M.	2	19·8 *t*	630	385
to. g. b. .	**Cassini** . . .	966	262½	27½	11½	5500 D'A.	Bordeaux .	1894	1894	98,500	½	..	1 *3·9-in.*, 3 *2·5-in.*, 4 *1·4-in.*	2	21·2 *t*	110	118
3rd cl. *cr.*	**Catinat** . . shd.	4048	331⅝	44½	21	9000 B.	Havre .	1896	1897	324,992	3	2 shield	4 *6·4-in.*, 10 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.* M.	2	19·0	563	384
3rd cl. *cr.*	**Chasseloup-Laubat**	3824	308½	43½	20¾	9000 D'A.	Cherbourg .	1893	1894	256,320	3	..	6 *6·4-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 12 *1·4-in.*, M.	2	19·25 *t*	587	358
2nd cl. *cr.*	**Châteaurenault** shd.	7898	442¾	55¾	24½	24,300 *t* N.S.	La Seyne .	1898	1902	606,656	2½	2 shield	2 *6·4-in.*, 6 *5·5-in.*, 10 *1·8-in.*	2	24·19 *t*	1400 / 2100	625
3rd cl. *cr.*	**Cosmao** . . .	1923	312	30½	14	6000	Bordeaux .	1888	1890	133,000	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	4	20·5 *t*	200	190
3rd cl. *cr.*	**D'Assas** . . .	3962	325½	45	20½	9500 D'A.	St. Nazaire .	1896	1898	292,682	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 11 *1·4-in.*	2	19·25 *t*	630	393
3rd cl. *cr.*	**Davout** . . .	3031	295¼	40	17½	9000 Nic.	Toulon .	1890	1902	221,827	3	..	6 *6·4-in.*, 4 *3·9-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 6 M.	4	20·07 *t*	600	336
g. v. .	**Décidée** . . .	635	184¾	26½	12½	1000 Nic.	Lorient .	1899	1900	54,100	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·0	99	99
2nd cl. *cr.*	**D'Entrecasteaux** shd.	7995	383½	58½	25¾	13,500	La Seyne .	1896	1898	667,740	4	10–3 H.S.	2 *9·4-in.*, 12 *5·5-in.*, 12 *1·8-in.*	6	19·2 *t*	650	521
3rd cl. *cr.*	**Descartes** . shd.	3970	326	42¼	21¾	9000 B.	St. Nazaire .	1894	1896	334,725	1½	..	4 *6·4-in.*, 10 *3·7-in.*, 8 *1·8-in.*, 4 *1·4-in.*	2	21·0 *t*	552	386
3rd cl. *cr.*	**D'Estrées** . shd.	2421	311¾	39¼	17¾	8500 Nor.	Rochefort .	1897	1900	208,200	1½	..	2 *5·5-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 2 *1·4-in.*	..	20·5 *t*	345 / 480	234
to. g. b. .	**D'Iberville** . .	952	262½	27	11½	5060 D'A.	St. Nazaire .	1893	1894	99,120	½	..	1 *3·9-in.*, 1 *2·5-in.*, 4 *1·4-in.*	6	21·4 *t*	117	118
3rd cl. *cr.*	**Du Chayla** . shd.	3890	325½	45	20½	10,009 D'A.	Cherbourg .	1895	1897	315,835	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 3 *1·4-in.*, 2 M.	2	20·2 *t*	624	385
to. g. b. .	**Dunois** . . .	889	256	27¾	12¾	7000 N.S.	Cherbourg .	1897	1898	123,383	..	..	6 *2·5-in.*, 6 *1·8-in.* . .	..	23·0	137	128

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to. cr.	Epervier		1268	216½	29¼	15½	3200	Rochefort	1885	1887	80,000	1½	..	5 *3·9-in.*, 1 *2·5-in.*, 6 M.	4	17·6 *t*	160	134
to. cr.	Faucon		1311	216½	29¼	15½	3200	Toulon	1887	1888	80,000	1½	..	5 *3·9-in.*, 1 *2·5-in.*, 6 M.	4	18·0 *t*	150	134
3rd cl. *cr.*	Forbin		1935	312	30½	16	5700	Rochefort	1888	1890	123,739	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	4	20·6	200	190
T.D.S.	Foudre		5984	370½	52½	23½	11,900 *t* D'A.	Bordeaux	1895	1897	407,712	3½	..	8 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	4	19·9 *t*	840	410
3rd cl. *cr.*	Friant		3882	308½	43½	20¾	9000 Nic.	Brest	1893	1894	308,750	3	..	6 *6·4-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 6 *1·4-in.*	2	18·19	587	358
3rd cl. *cr.*	Galilée		2318	330¼	34½	17¾	6600 B.	Rochefort	1896	1897	208,152	1½	2 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 8 *1·4-in.*	2	20·0	226	248
2nd cl. *cr.*	Guichen	shd.	8151	436¼	54¾	24½	24,000 D'A.	St. Nazaire	1897	1902	611,945	2½	2 shield	2 *6·4-in.*, 6 *5·5-in.*, 10 *1·8-in.*	2	23·0	1460	625
3rd cl. *cr.*	Infernet	shd.	2435	311¾	39¼	15½	8500 Nor.	Bordeaux	1899	1900	193,000	1½	..	2 *5·5-in.*, 4 *3·9-in.*, 8 *1·8-in.*	2	20·5	345/480	234
3rd cl. *cr.*	Isly		4406	346	48¾	19½	8100	Brest	1891	1892	252,760	3	..	4 *6·4-in.*, 6 *5·5-in.*, 14 *2·5-in.* and *1·8-in.*, 8 M.	3	18·3	880	332
2nd cl. *cr.*	Jurien de la Gravière	shd.	5595	440	43½	22	17,000 Guyot	Lorient	1899	1901	475,979	3	..	8 *6·4-in.*, 12 *1·8-in.*	2	22·9 *t*	600/900	511
g. v.	Kersaint	shd.	1223	226	34½	15	2200	Rochefort	1897	1898	107,933	..	..	1 *5·5-in.*, 5 *3·9-in.*, 7 *1·4-in.*	..	15·0	199	110
to. g. b.	La Hire		889	256	27¾	12¾	7000 N.S.	Cherbourg	1898	1899	123,383	..	..	6 *2·5-in.*, 6 *1·8-in.*	..	23·0	137	128
3rd cl. *cr.*	Lalande		1968	311½	31½	14	6000	Bordeaux	1888	1900	133,800	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	4	22·0	200	190
3rd cl. *cr.*	Lavoisier		2285	330½	34½	17¾	6400 B.	Rochefort	1897	1899	202,024	1½	2 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 4 M.	2	20·0	226	248
3rd cl. *cr.*	Linois		2308	321½	34½	17½	6600	La Seyne	1894	1895	163,014	1½	3·9 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 4 *1·4-in.*, 4 M.	4	20·5 *t*	200	248
3rd cl. *cr.*	Pascal		3951	326	42¼	21½	9000 *t* B.	Toulon	1895	1897	322,321	1½	..	4 *6·4-in.*, 10 *3·9-in.*, 8 *1·8-in.*, 4 *1·4-in.*, M.	2	20·0 *t*	650	378
3rd cl. *cr.*	Protet	shd.	4001	331¾	44¾	21	9300	Bordeaux	1898	1900	324,992	2½	2 shield	4 *6·4-in.*, 10 *3·9-in.*, 10 *1·8-in.*, 2 *1·4-in.*	2	20·2 *t*	563	384
3rd cl. *cr.*	Surcouf		2012	312	30½	14	6000	Cherbourg	1888	1900	131,200	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	4	20·5 *t*	200	190
g. v.	Surprise		617	184¾	24½	12¼	853 *t*	Havre	1895	1896	50,954	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·4 *t*	73	99
g. v.	Zélée		554	185½	26	10½	1000 Nic.	Rochefort	1899	1900	..	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·0	80	75

Gun vessel Fulton (899 tons); gunboats Comète, Lion. Shallow-draught gunboats Argus and Vigilante, launched at Chiswick 1900:—displacement, 122 tons; 13 knots.

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Merchant Cruisers (Auxiliary to French Navy).

To what Company belonging.	Name.	Register Tonnage.	Length.	Beam.	Depth.	Speed.	When built.
		Tons.	Feet.	Feet.	Feet.	Knots.	
Compagnie Générale Transatlantique	La Provence	15,000	—	—	—	22	1905
	La Lorraine	11,869	563·1	60·0	35·9	20	1900
	La Savoie	11,200	563·1	60·0	35·9	20	1900
	L'Aquitaine	8810	500·0	57·3	34·0	19	1890
	La Touraine	9047	520·2	56·0	34·6	19	1890
	Duc de Bragance	2096	334·6	34·2	16·8	17½	1889
	Eugène Pereire	2078	334·6	35·1	23·9	17½	1888
	Général Chanzy	2299	341·2	35·7	15·5	17½	1891
	La Bretagne	7112	495·4	51·8	34·5	17½	1886
	La Champagne	7087	493·4	51·8	34·5	17½	1885
	La Gascogne	7395	495·4	52·2	34·8	17½	1886
	Maréchal Bugeaud	2206	342·5	34·1	23·0	17½	1890
	Ville d'Alger	2211	342·7	36·1	23·0	17½	1890
Messageries Maritimes	Armand Béhic	6635	486·6	50·1	36·8	17½	1892
	Australien	6570	482·3	49·2	34·1	17½	1889
	Polynésien	6569	482·3	49·2	34·1	17½	1890
	Ville de la Ciotat	6631	485·8	49·9	36·8	17½	1892
	Annam	6344	446·2	50·9	36·1	17½	1898
	Atlantique	6708	468·9	50·6	32·8	17½	1899
	Tonkin	6364	446·2	50·9	36·1	17½	1898

NOTE.—The armament for the larger ships is 7 5·5-in. and smaller quick-firers.
Other vessels of less speed of the Compagnie Transatlantique and the Messageries Maritimes are in the list.

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GERMANY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.		Guns.	Torpedo Tubes.			
															Heavy Guns.	Secondary.					
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c. d. s.	**Aegir**	4084	267	49¼	17¾	4800 T.	Kiel (Danzig)	1895 1903	1897	233,500	9½ H.S.	2	..	..	8¾ H.S.	..	3 *9·4-in.*, 10 *3·4-in.*, 6 M.	4 (1 sub.)	14·8 *t*	225 †	276
b.	**Baden** ¶	7252	321½	60	15½	6200 Dürr.	Kiel	1880 1897	1884	444,886	16	2¾	10	..	10	..	6 *10·2-in.*, 8 *3·4-in.*, 8 *1·4-in.*, 1 l., 6 M.	5 (2 sub.)	14·0	700	376
b.	**Baden (Ersatz)** *	18,307	472	82¾	26	25,000	Kiel (Germania)	1908	..	1,825,000	12–4	..	..	..	11	..	12 *11-in.*	6	19·5	..	950
c. d. s.	**Beowulf**	4049	267	49¼	17¾	4800 T.S.	Bremen	1890 1902	1893	175,000	9½	1¼	..	..	8	..	3 *9·4-in.*, 10 *3·4-in.*, 7 M.	4	15·0	580 †	297
b.	**Beowulf (Ersatz)** **	19,000	..	..	..	..	..	Pro.	..	..	12–4	..	..	..	..	..	12 *11-in.*	6	19·5	..	950
a. c.	**Blücher*** (E)	14,760	..	..	..	35,000	Kiel	1908	..	..	6 K.S.	..	..	..	..	..	8 *11-in.*, 20 *3·4-in.*	3	22·5	..	791
b.	**Brandenburg**	9874	354¼	65	24½	9640	Stettin (Vulcan)	1891	1893	606,500§	15¾ *comp.*	2½	..	..	11¾ *comp.*	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	3	16·5 *t*	680 800	552
b.	**Braunschweig**	12,997	398½	73½	24½	16,000 T. S. & C.	Germania	1902	1904	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (sub.)	18·0	700 1600‡	660
b.	**Deutschland**	13,200	398½	72¾	24½	16,939 T. S. & C.	Germania	1904	1906	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 22 *3·4-in.*, 4 *1·4-in.*, 4 M.	6 (sub.)	18·5 *t*	700 1800†	736
b.	**Elsass**	12,997	398½	72¾	24½	16,812 W.T.& C.	Danzig (Schichau)	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5 sub.)	18·7	800 1600†	660
a. c.	**F***	19,000	..	..	..	45,000 (turbines)	Hamburg	Bldg.	..	1,800,000	8	..	..	..	..	..	10 *11-in.*	..	25	..	..
a. c.	**G** **	19,000	..	..	..	..	..	Pro.	..	..	..	..	..	..	..	..	..	..	..	..	..
a. c.	**Friedrich Karl**	8858	393½	65½	24	18,500 Dürr.	Hamburg	1902	1904	875,000	4 K.S.	2	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 14 *1·4-in.*, 4 M.	4 (3sub.)	20·5 *t*	950 1500†	504
c. d. s.	**Frithjof**	4049	267	49¼	17¾	4800 T. S.	Bremen	1891	1892	175,000	9¼ H. S.	1¼	..	..	7¾ H. S.	4 K.S.	3 *9·4-in.*, 8 *3·4-in.*, 6 M.	4	14·8	225	276
a. c.	**Fürst Bismarck**	10,570	393½	66½	26	14,000 Dürr.	Kiel	1897	1900	..	7¾ K. S.	3	..	..	7¾ K. S.	..	4 *9·4-in.*, 12 *5·9-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 8 M.	6 (5 sub.)	19·0	1000§	565
a. c.	**Gneisenau**	11,420	449½	70¾	24½	26,000 T.S.	Bremen(Weser)	1906	1908	..	6–3 K.S.	2	6–4¾	..	6¾	..	8 8 *2-in.*, 6 6 *-in.*, 20 *3·4-in.*, 14 *smaller.*	4	23·8 *t*	800§ 2000	650
c. d. s.	**Hagen**	4049	267	49¼	17¾	5250 T.	Kiel.	1893 1900	1895	..	7 K. S.	1¼	..	..	7¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 7 M.	4	15·0	580§	297

* Particulars doubtful. ** Estimates 1908; particulars doubtful. † Also liquid fuel. ‡ And 200 tons "tar oil." § Exclusive of armament.

¶ This ship as well as the Bayern, Sachsen and Württemberg will be condemned as soon as the ships to replace them have been completed.

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GERMANY.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.‖	tons.	
b.	Hannover	13,200	398½	73¾	24½	22,492 T. S. t	Wilhelms-haven	1905	1907	1,157,500	9½–4 K. S.	3	8 K.S.	6 K.S.	10–6 K. S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	19·16 *t*	700 1800◊	600
c. d. s.	Heimdall	4049	267	49¼	17¾	4393 T. S.	Wilhelms-haven	1892 1902	1893	233,500	7 K. S.	1¼	..	..	7¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 7 M.	4	15·0	580§	297
b.	Hessen	12,997	398½	73¾	24½	16,000 T. S. & C.	Kiel (Germania)	1903	1905	1,157,500	·9–4 K. S.	3	6 K.S.	6 K.S.	10–6 K. S.	6 K.S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5 sub.)	18·0	800 1600◊	660
c. d. s.	Hildebrand	4049	267	49¼	17¾	4413 T. S	Kiel.	1892	1893	218,000	7 K. S.	1¼	..	..	7¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 7 M.	4	15·0	580§	297
b.	Kaiser Barbarossa					13,000 C. & T.	Danzig	1900	1901 1907	962,500	11¾ H. N. S.	3	..	..	9¾ H. N. S.	6 H.N.S.	4 *9·4-in.*, 14 *5·9-in.*, 12 *3·3-in.* 12 *1·4-in.*, 8 M.	4 (sub.)	16·0	650 1050◊	700
b.	Kaiser Friedrich III.					13,000 C. & T.	Wilhelms-haven	1896	1898												
b.	Kaiser Wilhelm II.	10,974	377¼	66¾	25½	13,000 C. & T. S.	Wilhelms-haven	1897	1900												
b.	Kaiser Wilhelm der Grosse					13,000 C. & T. S.	Germania	1899	1901												
b.	Kaiser Karl der Grosse					13,000 C. & T. S.	Hamburg (Blohm & Voss)	1899	1901												
b.	Kurfürst Friedrich Wilhelm.	9874	354¼	65	24½	9959	Wilhelms-haven	1891	1893	653,000‡	15¾ *comp.*	2½	..	..	11¾ *comp.*	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	3 (sub.)	16·0	680 800	550
b.	Lothringen	12,997	398½	73¾	24½	16,950 W.T.&C.	Schichau (Danzig)	1904	1906	1,157,500	9–4 K. S.	3	6 K. S.	6 K.S.	10–6 K. S.	6 K. S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5 sub.)	18·54 *t*	800 1600◊	600
b.	Mecklenburg	11,643	393¾	68¼	24½	14,000 C. T. & S.	Stettin (Vulcan)	1901	1903	1,061,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·1 *t*	700 1450◊	715
b.	Nassau*	17,679	472	82¾	26	25,000 tur.	Wilhelms-haven	1908	..	1,825,000	12–4 K.S.	..	..	..	11 K.S.	..	12 *11-in.*, 12 *6·6-in.*	6	19·0	..	950
c. d. s. b.	Odin	4084	267	49¼	17¾	4800 T. S.	Danzig	1894	1896	..	9½ H. S.	2	..	..	8¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 6 M.	4 (1sub.)	15·0	225§	266
b.	Oldenburg	5140	246	59	19½	3900	Stettin	1884	1887	235,342	12 *comp.*	1	..	..	8 *comp.*	..	8 *9·4-in.*, 2 *3·4-in.*, 6 M.	4	13·5 *t*	475	356
b.	Oldenburg(Ersatz)***	19,000	..	..	..	..	..	Pro.	..	..	12–4	..	..	..	..	..	12 *11-in.*	6	19·5	..	950

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b.	**Pommern**	13,200	398½	72¾	24½	20,400 T. S. t.	Stettin (Vulcan)	1905	1907	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 22 *3·4-in.*, 4 *1·4-in.*, 4 M.	6 (5sub.)	19·21 *t*	700 1800§	736
b.	**Preussen**	12,997	389½	73¾	24½	18,374 W.T.& C.	Stettin	1903	1905	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *16·7-in.*, 12 *3·4-in.*, 12 *1·4-in.* & 8 M.	6 (5sub.)	18·6 *t*	800 1600§	660
a. c.	**Prinz Adalbert**	8858	393½	65½	24	18,500 Dürr.	Kiel	1901	1903	885,000	4 K.S.	1½	3 K.S.	3 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 14 *1·4-in.*, 4 M.	4 (3sub.)	20·3	950 1500§	504
a. c.	**Prinz Heinrich**	8759	396	64¼	25¼	15,000 Dürr.	Kiel	1900	1902	730,000	4 K.S.	2½	4 K.S.	..	6 K.S.	4 K.S.	2 *9·4-in.*, 10 *5·9-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (3sub.)	20·0	950	528
a. c.	**Roon**	9350	403¼	65½	24	20,625 Dürr.	Kiel	1903	1905	875,000	4–3 K.S.	2¾	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 16 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (sub.)	21·17	750 1800§	50
b.	**Sachsen** (Ersatz)*	17,679	472	82¾	26	25,000 (tur.)	Bremen (Weser)	Blg.	..	1,825,000	12–4	..	..	..	11	..	12 *11-in.*, 12 *6·6-in.*	6	19·0	..	950
a. c.	**Scharnhorst**	11,420	449½	70¾	24½	26,000 T. S.	Hamburg	1906	1908	..	6–3 K.S.	2	6–4¾	..	6¾	..	8 *8·2-in.*, 6 *6-in.*, 20 *3·4-in.*, 14 smaller	4	22·5	800§ 2000	650
b.	**Schlesien**	13,200	398½	72¾	24½	16,939 T. S. & C.	Danzig Schichau Kiel Germania	1906	..	1,214,000	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6¾ K.S.	4 *11-in.*, 14 *6·7-in.*, 22 *3·4-in.*, 4 *1·4*, 4 M.	6 (sub.)	18·5 *t.*	700 1800†	736
b.	**Schleswig-Holstein**																					
b.	**Schwaben**	11,643	393¾	68¼	24¾	14,000 C.&T.S.	Wilhelmshaven	1901	1903	1,061,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	700 1450§	715
c. d. s.	**Siegfried**	4049	267	49¼	17¾	4800 T. S.	Germania	1889	1890	175,000	9½	1¼	..	..	7¾	..	3 *9·4-in.*, 6 *3·4-in.*, 6 M.	4	14·8 *t*	225§	276
b.	**Siegfried** (Ersatz)***	19,000	..	..	..	..	..	Pro.	..	..	12–4	..	..	..	..	..	12 *11-in.*	6	19·5	..	950
b.	**Weissenburg**	9874	354¼	65	24¾	9000	Stettin (Vulcan)	1891	1893	659,475‡	15¾	2½	..	..	11¾	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	3 (sub.)	16·0	680 800	552
b.	**Wettin**	11,643	393¾	68¼	24¾	14,000 C.&T.S.	Schichau	1901	1902	1,071,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	700 1450§	715
b.	**Wittelsbach**						Wilhelmshaven	1900	1902	1,071,250												
b.	**Wörth**	9874	354¼	65	24½	10,224 (*t*)	Kiel	1892	1894	595,250‡	15¾	2½	..	..	11¾	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	3 (sub.)	17·2	680 800	552
b.	**Württemberg** (Ersatz)**	18,307	472	82¾	26	25,000	Stettin (Vulcan)	Bldg.	..	1,825,000	12–4 K.S.	..	..	..	11 K.S.	..	12 *11-in.*	6	19·5	..	950
a. c.	**Yorck**	9350	403¼	65½	24	19,183 Dürr.	Hamburg	1904	1905	875,000	4–3 K.S.	2	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, *10* *5·9-in.*, 16 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (sub.)	21·1 *t*	750 1600†	550
b.	**Zähringen**	11,643	393¾	68¼	24¾	15,000 C.&T.S.	Germania	1901	1902	1,071,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	19·0	650 1000§	715

* Particulars doubtful. ** Estimates, 1907; particulars doubtful. *** Estimates, 1908; particulars doubtful. ‡ Exclusive of armament. § Also liquid fuel.

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GERMANY.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	Amazone . . shd.	2618	328	38½	16	8000 T.S.	Kiel (Germania) .	1900	1901	247,000	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·5 *t*	560	249
,, ,,	Arcona . . shd.	2657	328	38½	16	8000 T.S.	Bremen (Weser) .	1902	1903	254,500	2	..	10 *4·1-in.*, 12 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·0	700	249
,, ,,	Ariadne . . shd.	2618	328	38½	16	8000 T.S.	Bremen (Weser) .	1900	1901	247,000	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	22·0	560	249
,, ,,	Berlin. . . shd.	3200	341	43¼	16½	11,000 T.S.	Danzig . .	1903	1904	254,500	2	..	10 *4·1-in.*, 10 *1·4-in.*, 4 M., 2 l.	2 (sub.)	23·2 *t*	800	286
,, ,,	Bremen . . .	3200	341	43¼	16½	10,000 T.S.	Bremen (Weser) .	1903	1904	254,500	2	..	10 *4·1-in.*, 10 *1·4-in.*, 4 M., 2 l.	2 (sub.)	23·0	800	286
,, ,,	Bussard . . .	1555	256	30¼	18¼	2900	Danzig . .	1890	1890	..	3	..	8 *4·1-in.*, 7 M. . .	2	16·5 *t*	300	165
to. g. b. .	Comet . . .	971	262½	31¼	13¾	5000	Stettin (Vulcan) .	1892	1896	..	2	..	4 *3·4-in.*, 2 M. . .	3	21·0 *t*	120	115
3rd cl. *cr.*	Condor . . .	1614	246	33½	15	2930	Hamburg . .	1892	1892	..	3	..	8 *4·1-in.*, 7 M. . .	2	16·5 *t*	300	165
3rd cl. *cr.*	Cormoran . . .	1614	246	33½	15	2930	Danzig . . .	1892	1893	..	3	..	8 *4·1-in.*, 7 M. . .	2	16·0	300	165
3rd cl. *cr.*	Danzig . . .	3200	341	43¼	16½	10,000 T.S.	Danzig . . .	1905	1906	254,500	2	..	10 *4·1-in.*, 10 *1·4-in.*, 4 M., 2 l.	2 (sub.)	23·0	800	286
3rd cl. *cr.*	Dresden . . .	3544	364	44¼	15¾	13,500 (tur.)	Hamburg . .	1907	..	..	..	..	10 *4·2-in.*, 12 smaller and M. . . .	..	24·5	900	..
g.b. .	Eber	977	206¾	30¼	10¾	1300 T.S.	Danzig . . .	1903	1904	91,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·0	240	121
3rd cl. *cr.*	Falke	1555	246	33½	15	2900	Kiel . . .	1891	1892	..	3	..	8 *4·1-in.*, 7 M. . .	2	15·5 *t*	300	165
3rd cl. *cr.*	Frauenlob . . shd.	2657	328	38½	16	8000 T.S.	Bremen (Weser) .	1902	1904	254,500	2	..	10 *4·1-in.*, 12 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·0	700	249
2nd cl. *cr.*	Freya	5569	344½	57	20¾	10,000 Nic.	Danzig . . .	1897	1898	..	4 N.S.	4 N.S.	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
3rd cl. *cr.*	Gazelle . . shd.	2603	328	38½	16¾	6400 Nic.	Kiel (Germania) .	1898	1898	225,000	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	18·0	560	210
,, ,,	Geflon . . .	3705	344½	42¾	20¾	9000	Danzig (Schichau) .	1893	1894	..	1¼	..	10 *4·1-in.*, 6 *2·1-in.*, 1 l., 8 M.	2	19·0	780	302

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3rd cl. *cr.*	**Geier**	shd.	1597	249¼	34¾	15½	2960	Wilhelmshaven	1894	1896	..	3	..	8 *4·1-in.*, 7 M.	2	16·2 *t*	300	165
3rd cl. *cr.*	**Greif** (Ersatz)		3740	..	..	..	..	Danzig (Schichau).	Bldg.	..	..	2	..	10 *4·2-in*, 12 smaller and M.	2 (sub.)	..	..	..
„ „	**Hamburg**	shd.	3200	341	43¼	16½	11,500 T.S.	Stettin (Vulcan)	1903	1904	254,500	2	..	10 *4·1-in.*, 10 *1·4-in.*, 4 M., 2 l.	2 (sub.)	23·28 *t*	800	249
2nd cl. *cr.*	**Hansa**	shd.	5791	345½	57¾	21¾	10,000 B.	Stettin (Vulcan)	1898	1899	..	4 N.S.	4 N.S.	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	3 (sub.)	19·5	825	465
d.v.	**Hela**		2004	328	36	14¾	5860	Bremen (Weser)	1895	1896	..	1½	..	4 *3·4-in.*, 6 *1·9-in.*, 2 M.	3	20·0	500	178
2nd cl. *cr.*	**Hertha**		5569	344½	57	21¾	10,000 B.	Stettin (Vulcan)	1897	1898	..	4 N.S.	4	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
g. b.	**Iltis**	shd.	881	203½	29¾	10¾	1300 T	Danzig (Schichau).	1898	1898	100,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	165	121
3rd cl. *cr.*	**Irene**	shd	4224	308	46	21	8000	Stettin (Vulcan)	1887	1888	220,000	3	..	4 *5·9-in.*, 8 *4·1-in.*, 6 *1·9-in.*, 1 l., 8 M	3	19·8 *t*	540	365
3rd cl. *cr.*	**Jagd** (Ersatz)		3740	..	..	..	..	Stettin (Vulcan)	Bldg	.	..	2	..	10 *4·2-in.*, 12 smaller and M.	2 (sub.)	.	..	..
g. b.	**Jaguar**	shd.	900	203½	29¾	10¾	1300 T.	Danzig (Schichau).	1898	1899	90,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	165	121
2nd cl. *cr.*	**Kaiserin Augusta**	shd.	5956	387	52½	23	14,000	Kiel (Germania)	1892	1896	..	3½	..	12 *5·9-in.*, 8 *3·4-in.*, 2 l., 8 M.	3	21·0	850	436
3rd cl. *cr.*	**Königsberg**		3350	354¼	54½	..	13,200 T.S.	Kiel	1906	..	..	..	..	10 *4·1-in.*, 8 *2·2-in.*, 4 M.	2 (sub.)	23·5	400 850	295
„ „	**Leipzig**		3200	341	43¼	16½	11,000	Bremen (Weser)	1905	1906	254,500	2	..	10 *4·1-in.*, 10 *1 4-in.*, 4 M., 2 l.	2 (sub.)	23·0	800	286
„ „	**Lübeck**		3200	341	43¼	16½	14,000 T.S. tur.	Stettin (Vulcan)	1904	1906	254,500	2	..	10 *4·1-in.*, 10 *1·4-in.*, 4 M., 2 l.	2 (sub.)	23·0	800	286
g. b.	**Luchs**		962	206¾	30¼	10¾	1300 T.S.	Danzig	1899	1900	91,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
3rd cl. *cr.*	**Medusa**	shd.	2618	328	38½	16	8000 T.S.	Bremen (Weser)	1900	1901	247,000	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	22·0	560	249
„ „	**München**	shd.	3200	341	43¼	16½	11,000 T.S.	Bremen (Weser)	1904	1905	254,500	..	..	10 *4·1-in.*, 10 *1·4-in.*, 4 M., 2 l.	2 (sub.)	23·4 *t*	800	286
„ „	**Niobe**	shd.	2603	328	38½	15	8000 T.S.	Bremen (Weser)	1899	1901	217,500	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	20·0	560	250
„ „	**Nymphe**	shd.	2618	328	38½	15	8000 T.S.	Kiel (Germania)	1899	1901	217,500							
„ „	**Nürnberg**		3396	354¼	54½	..	13,200 T.S.	Kiel	1906	1908	..	.	..	10 *4·1-in.*, 8 *2·2-in.*, 4 M.	2 (sub.)	23·5	400 850	295
g. b.	**Panther**		962	206¾	30¼	10¾	1300 T.S.	Danzig	1901	1902	91,000	.	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
cr.	**Pelikan** (mining ship)		2215	259	38	14½	3000	Kiel	1890	1891	..	..	..	4 *3·4-in.*, 4 M.	..	15·4 *t*	370	183

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GERMANY.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			kts.	tons.	
3rd cl. *cr.*	Pfeil (Ersatz) .	3544	364	44¼	15⅝	(tur.)	Danzig . . .	Bldg.	..	..	..	..	10 *4·2-in.*, 12 smaller and M.	2	24·5	900	..
„ „	Prinzess Wilhelm shd.	4224	339½	46	21	8000	Kiel (Germania) .	1887	1888	220,000	3	..	4 *5·9-in.*, 8 *4·1-in.*, 6 *1·9-in.*, 1 l., 8 M.	3	18·7 *t*	540	365
g. v. .	Schwalbe . . .	1102	203	30½	12½	1500	Wilhelmshaven .	1887	1887	..	3	..	8 *4·1-in.*, 7 M. . .	..	13·5 *t*	264	117
3rd cl. *cr.*	Schwalbe (Ersatz)* .	..	..	..	..	..	..	Pro.	..	..	..	..	..	..	..	..	..
3rd cl. *cr.*	Seeadler . . .	1614	246	33½	15	2800	Hamburg . .	1892	1892	..	3	..	8 *4·1-in.*, 7 M. . .	2	16·0	300	165
g. v. .	Sperber . . .	1102	236	29¾	12½	1500	Wilhelmshaven .	1888	1889	..	3	..	8 *4·1-in.*, 6 M. . .	..	13·5 *t*	264	117
3rd cl. *cr.*	Sperber (Ersatz)* .	..	..	..	..	..	..	Pro.	..	..	..	..	..	..	..	..	..
3rd cl. *cr.*	Stettin . . .	3396	354¼	54½	..	13,200 T.S. tur.	Stettin (Vulcan) .	1907	1907	..	..	..	10 *4·1-in.*, 8 *2·2-in.*, 4 M.	2 (sub.)	23·5	400 850	295
3rd cl. *cr.*	Stuttgart . . .	3396	354¼	54½	..	13,200 T.S. tur.	Kiel . . .	1906	1908	..	..	..	10 *4·1-in.*, 8 *2·2-in.* 4 M.	2 (sub.)	23·3 *t*	400 850	295
3rd cl. *cr.*	Thetis . . . shd.	2618	344½	38½	16	8000 T.S.	Danzig . . .	1900	1901	247,000	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·8 *t*	560	249
g. b. .	Tiger	962	203½	29¾	10	1300 T.S.	Danzig . . .	1899	1900	..	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
3rd cl. *cr.*	Undine . . shd.	2657	328	38½	16	8000 T.S.	Kiel (Howaldt) .	1902	1904	254,500	2	..	10 *4·1-in.*, 12 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·0	700	249
2nd pl. *cr.*	Victoria Luise . .	5569	344½	57	21¾	10,000 Dürr.	Bremen (Weser) .	1897	1898	..	4 H.S.	4 H.S.	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
„ „	Vineta . . shd.	5791	345½	57¾	21¾	10,000 Dürr.	Danzig . . .	1897	1899	..	4 H.S.	4 H.S.	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465

The Imperial Yacht Hohenzollern, 4187 tons, 9460 I.H.P., 22 knots, carries 8 1·9-in. Q.F., but provision is made for mounting 3 4·1-in., 12 1·9-in. Q.F. and 4 M. River gunboats for China, the Tsingtau, Vaterland and Vorwärtz (168 tons). The mining vessels Nautilus and Albatross, built at Bremen, launched 1896 and 1897 (2000 tons).

* Estimates 1908.

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Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Register Tonnage.	Length.	Beam.	Draught of Water.	Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft. in.	ft. in.	ft. in.		knots.		
North German Lloyd	Kronprinz Cäcilie	..	..	..	..	..	..	1906	The armament is of 6-in. and smaller quick-firers.
	Kaiser Wilhelm II.	19,500	678 0	72 0	..	44,000	24	1902	
	Kronprinz Wilhelm	14,800	640 0	66 0	26 3	30,000	23	1901	
	Kaiser Wilhelm der Grosse	14,349	625 0	66 0	27 0	28,000	23	1897	
	Trave	5262	436 6	48 0	..	1300(*a*)	18	1886	
Hamburg-America	Deutschland	16,500	..	..	..	37,000	23½	1900	

(*a*) Nominal horse-power.

Many other vessels of less than 18 knots speed are in the list.

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GREECE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	**Hydra** . .	4808	334½	51¾	23¼	7000	St. Nazaire La Seyne .	1889 1900	1891	..	11¾–4	2½	3	..	13½	..	3 *10·6-in.* Canet, 5 *5·9-in.*, 1 *3·9-in.*, 8 *2·5-in.*, 4 *1·8-in.*, 12 *1·4-in.*	3	17·0	600	400
,,	**Psara** . . .	4808	334½	51¾	23¼	7000	Havre . . La Seyne .	1890 1897	1892	..	11¾–4	2½	3	..	13½	..					
,,	**Spetsai** . .	4808	334½	51¾	23¼	7000	Havre . . La Seyne .	1889 1900	1891	..	11¾–4	2½	3	..	13½	..					

GREECE.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
g.v.	**Acheloos** . . .	420	130	24½	11½	400	Blackwall .	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M..	..	10·0	50	..
,,	**Alphios** . . .	420	130	24½	11½	400	Blackwall .	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M..	..	10·0	50	..
,,	**Eurotas** . . .	420	130	24½	11½	400	Dumbarton .	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M..	..	10·0	50	..
corv.	**Sfaktirea** . .	1000	216½	29¼	18	2400	England .	1885	1886	..	..	..	2 *3·9-in.* (K.), 2 M..	..	14·5	100	..

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 14 knots speed. Gunboats, Ambrakia and Aktion, of 440 tons displacement, 380 horse-power, 10 knots speed, fitted with 1 10·2-in. Krupp gun and 2 machine guns; launched 1885.

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ITALY.—Armoured Ships.

Class.	NAME	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	ins.	ins.	ins.	ins.	ins.			knots.	tons.	
b.	A	18,000	..	..	..	..	..	Bldg.	..	..	..	..	..	..	..	..	8 *12·5-in.*	..	..	..	..
,,	B							Pro.													
a.c.	Amalfi	9832	429¾	68¾	24¾	18,000 B.	Genoa (Odero)	1907	..	880,000	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	..	4 *10-in.*, 8 *8-in.*, 16 *3-in.*, 8 *1·8-in.*	3 (2sub.)	22·5	700 / 1500	
a.c.	Ammiraglio di St. Bon	9645	344½	69¼	24¾	13,500	Venice	1897	1901	..	9¾–4 H.S.	3–1½	6 H.S.	6 H.S.	9¾ H.S.	6 H.S.	4 *10-in.*, 8 *6-in.*, 8 *4·7-in.*, 2 *2·9-in.*, 8 *2·2-in.*, 12 *1·4-in.*, 2 M.	4	18·3 *t*	600	548
t.	Benedetto Brin	13,214	426½	78¼	27¼	20,400 B.	Castellamare	1901	1904	..	6-2 H.S.	3	6 H.S.	8 H.S.	10 H.S.	6 H.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.*, 16 *3-in.*, 8 *1·8-in.*, 4 M.	4 (sub.)	19·5 *t*	1000 / 2000	719
,,	Carlo Alberto	6396	325	59	23	13,220 *t*	Spezia	1896	1898	..	6-4½ H.S.	1½	6 H.S.	..	6 H.S.	4½ shields	12 *6-in.*, 6 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.	4	19·2 *t*	1000	500
,,	Dandolo	12,071	341	64¾	26½	8045	Spezia	1878 1898	1881	872,640	21½	2	17	16	10 H.S.	2 screens	4 *10-in.* (A.), 8 *6-in.*, 5 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 14 *1·4-in.*, 2 M.	4	15.6 *t*	732	506
,,	Emanuele Filiberto	9645	344½	69¼	24¾	13,500	Castellamare	1897	1902	..	9¾–4 H.S.	3–1	6 H.S.	6 H.S.	9¾ H.S.	6 H.S.	4 *10-in.*, 8 *6-in.*, 8 *4·7-in.*, 2 *2·9-in.*, 8 *2·2-in.*, 12 *1·4-in.*, 2 M.	4	18·3 *t*	600	536
a.c.	Francesco Ferruccio	7294	344	59¾	23¼	13,500 Nic.	Venice	1902	1904	..	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S	6 H.S.	1 *10-in.*, 2 *8-in*, 14 *6-in.*, 10 *2·9-in.*, 6 *1·8-in.*, 2 M.	4 (sub.)	20·0	655 / 1200	540
b.	Giuseppe Garibaldi					14,713 *t* Nic.	Sestri-Ponente (Ansaldo)	1899	1901												
a.c.	Marco Polo	4511	327	48¼	19½	10,543 *t*	Castellamare	1892	1895	344,400	4	1	4	4	4	..	6 *5·9-in.*, 10 *4·7-in.*, 2 *2·9-in.*, 9 *2·2-in.*, 4 *1·4-in.*, 2 M.	5 (1sub.)	19·0 *t*	600	394
b.	Napoli	12,425	435½	73½	27¼	20,000 B.&W.	Castellamare	1905	..	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	4 (2sub.)	22·0	1000 / 2000	..
	Regina Elena					20,000 B.	Spezia	1904	1907												

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ITALY.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
a.c.	**Pisa**	9832	429¾	68¾	24¾	18,000 B.	Leghorn (Orlando)	1907	..	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	..	4 *10-in.*, 8 *8-in.*, 16 *3-in.*, 8 *1·8-in.*	3 (2sub.)	23·0	700 1600	..
b.	**Regina Margherita**	13,214	426½	78¼	27¼	20,664 Nic.	Spezia	1901	1904	..	6 H.S.	3	6 H.S.	8 H.S.	8 H.S.	6 H.S.	4 *12-in.* 4 *8-in.*, 12 *6-in.*, 16 *3-in.*, 8 *1·8-in.*, 4 M.	4 (sub.)	20·2 *t*	1000 2000	719
,,	**Re Umberto**	13,673	400	76¾	28½	19,500	Castellamare	1888	1893	1,058,500	4	3	4	2¾	18	..	4 *67-ton* (A.), 8 *6-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 15 *2·2-in.*, 14 *1·4-in.*, 2 M.	5	19·0	1200	785
,,	**Roma**	12,425	435½	73½	27¼	20,000 B. & W.	Spezia	1907	..	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	4 (2sub.)	22·0	1000 2000	..
a.c.	**San Giorgio** / **San Marco**	9832	429¾	68¾	24¾	18000 Bl. 18000 tur.	Castellamare	1908 Bldg.	..	..	8–3½ K.S.	1¾	7 K.S.	7 K.S.	7–6 K.S.	7 K.S.	4 *10-in.*, 8 *8-in.*, 16 *3-in.*, 8 *1·8-in.*	3 (2sub.)	22·5	700 1600	..
b.	**Sardegna**	13,640	411	76¾	28½	19,650 *t*	Spezia	1890	1895	1,057,440	4	3	4	2¾	14¼ *comp.*	..	4 *67-ton* (A.), 8 *5·9-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 20 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	20·1 *t*	1200	785
,,	**Sicilia**	13,087	400	76¾	28½	19,500	Venice	1891	1895	1,050,000	4	3	4	2¾	18 *comp.*	..	4 *67-ton* (A.), 8 *5·9-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 20 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	19·2 *t*	1200	785
a.c.	**Varese**	7294	344	59¾	23⅓	13,500 B.	Leghorn (Orlando)	1899	1900	..	6–4½ H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	1 *10-in.*, 2 *8-in.*, 14 *6-in.*, 10 *2·9-in.*, 6 *1·8-in.*, 2 M.	4	20·0	650 1200	500
a.c.	**Vettor Pisani**	6396	325	59	23	13,000	Castellamare	1895	1897	..	6 H.S.	1½	6 H.S.	..	6 H.S.	4½ shields	12 *6-in.*, 6 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.	4	20·0	600	504
b.	**Vittorio Emanuele III**	12,425	435½	73½	27¼	20,000 B.	Castellamare	1904	1907	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	4 (sub.)	22·0	1000 2000	..

Old battleships Italia and Lepanto (15,549 tons) used as school ships.

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ITALY.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.*	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
to.cr.	Agordat	1292	287½	30½	11	8000	Castellamare	1899	1900	..	1	..	4 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*	2	22·0	160	158
to.g.b.	Aretusa	833	230	26¾	11¾	4420	Leghorn (Orlando)	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	20·7 *t*	120	111
3rd cl. *cr.*	Calabria	2428	249½	42	16¾	4094 *t*	Spezia	1894	1897	183,120	2	..	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	16·4 *t*	500	257
„	Caprera	833	230	27½	10½	4189	Leghorn (Orlando)	1894	1895	72,920	1	..	2 *4·7-in.*, 4 *2·2-in.*, 2 *1·4-in.*	5	21·0	120	111
to.cr.	Coatit	1292	287½	30½	11	8160	Castellamare	1899	1902	..	1	..	4 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*	2	21·1 *t*	160	158
g.v.	Curtatone	1272	177½	32¾	13½	1100	Venice	1887	1888	58,440	..	..	4 *2·2-in.*, 2 *1·4-in.*, 2 M.	..	12·0	197	131
3rd cl. *cr.*	Elba (shd.)	2689	272½	40¾	16½	7471 *t*	Castellamare	1893	1895	200,000	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·9 *t*	500	272
3rd cl. *cr.*	Etna	3470	282½	42½	19	6169	Castellamare	1885	1887	226,720	1½	5	2 *9·8-in.* (A.), 6 *5·9-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·8	630	315

* Shields.

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ITALY.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	Etruria . .	2245	262½	39½	16½	7585 *t*	Leghorn (Orlando)	1891	1893	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 2 M.	2	19·84 *t*	400	257
„ „	Fieramosca . .	3534	290	43½	19¼	7700	Leghorn (Orlando)	1888	1890	240,120	1½	5	2 *9·8-in.*, 6 *6-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·5 *t*	450	315
mining .	Goito . .	843	230	25½	11¾	2620	Castellamare . .	1887	1888	70,680	1	..	4 *2·2-in.*, 5 *1·4-in.* . .	5	19·0	130	111
g.v. .	Governolo . .	1235	185	33⅓	13¾	1100	Venice . .	1894	1896	58,440	..	..	4 *4·7-in.*, 4 *2·2 in.*, 2 *1·4-in.*, 2 M.	..	13·0	200	131
to.g.b. .	Iride . .	931	229½	27	10½	4242	Castellamare . .	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	19·6 *t*	120	111
3rd cl. *cr.*	Liguria . .	2245	262½	39½	16¾	7677 *t*	Sestri (Ansaldo) .	1893	1894	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 2 M.	2	19·6 *t*	430	257
„ „	Lombardia . .	2351	262½	39½	16½	6843 *t*	Castellamare . .	1890	1892	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·0 *t*	430	257
to.g.b. .	Minerva . .	833	246	27½	11¾	4800 W.T.	Sestri (Ansaldo) .	1892	1893	72,720	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in*	5	21·0	120	111
to.g.b. .	Montebello . .	801	230	25½	11¾	2776	Spezia . . .	1888	1899	74,120	..	1	6 *2·2-in.*, 2 *1·4-in.* . .	4	18·0	100	111
„ .	Partenope . .	821	246	27½	11¾	4200	Castellamare .	1890	1890	71,000	..	1	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	4	19·0	100	111

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3rd cl. *cr.*	**Piemonte** . .	2597	300	38	15	12,000	Elswick. . .	1888	1890	220,000	3	3	6 *6·6-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 6 *1·4-in.*, 4 M.	2	21·0	560	325
„ „	**Puglia** . . .	2498	269	41	16¾	7000	Taranto. . .	1898	1900	200,000	4½	1	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	20·0	650	257
to.g.b. .	**Saetta** . .	395	187	19¾	6½	2400	Castellamare . .	1887	1888	38,880	..	..	2 *2·2-in.*, 4 *1·4-in.* . .	3	20·0	90	70
mining .	**Tripoli** . . .	885	230	25¾	11¾	2543	Castellamare . .	1886	1887	72,080	..	1	7 *2·2-in.*	4	18·0	130	107
3rd cl. *cr.*	**Umbria** . .	2245	262½	39½	16½	7104 *t*	Leghorn (Orlando).	1891	1893	183,120	4½	2	4 *5·9-in.*, 6 *4·7-in*, 8 *2·2-in.*, 10 *1·4-in.*, 1 l., 2 M.	2	18·83 *t*	430	257
to.g.b. .	**Urania** . . .	833	230	27	11¼	4397	Sestri (Odero) .	1891	1892	72,920	..	1	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	20·0	120	111
3rd cl. *cr.*	**Vesuvio**. . .	3373	282¼	42½	19	6820	Leghorn (Orlando) .	1886	1888	218,320	5	1·5	2 *9·8-in.*, 6 *5·9-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·0	600	315
g.v. .	**Volturno** . .	1155	177¼	32¾	14¼	1100	Venice . . .	1887	1888	58,960	..	..	4 *4·7-in.*, 4 *2·2-in.*, 2 *1·4-in.*, 2 M.	..	13·0	206	131

Subsidised auxiliary cruisers and despatch vessels.—Nord America (La Veloce S.S. Co.), Regina Margherita, Galileo Galilei, Marco Polo, Umberto I., Cristoforo Colombo, Elettrico, Candia, Malta, Perseo, Orione, and some others (Navigazione Generale). The armament of these vessels is 2 2·2-in. Q.F., and 4 1·4-in. M. The coal and liquid fuel transports Bronte and Sterope (9490 tons) are completed.

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JAPAN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.*	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	A . . .	20,800	479	85½	27¾	26,500 tur.	Yokosuka	Bldg.	..	..	12-9½	..	..	..	..	..	12 *12-in.*, 10 *6-in.*, 12 *4·7-in.*	5 (sub.)	20·0	..	..
,,	B . . .						Kure .														
a.c.	A‡ . .	18,650	545	80	26½	44,000	Kure .	Bldg.	..	..	7–4	2	6	..	..	..	10 *12-in.*, besides *6-in.*, and *4·7-in.*	5 (sub.)	25·0	..	..
,,	B . . .						..	Pro.													
a.c.	Adzuma . .	9436	431½	59¼	21¾	17,000 B.	St. Nazaire	1899	1901	..	7–3½ H. S.	3	5 H.S.	..	6 H. S.	6 H.S.	4 *8-in.*, 12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*	5 (4 sub.)	20·0	600 1275	482
a.c.	Aki . . .	19,800	482	83½	27½	18,000 My. tur.	Kure .	1907	..	..	9–5 K. S.	..	..	..	..	..	4 *12-in.*, 12 *10-in.*, 12 *4·7-in.*	5 (4 sub.)	20·5	..	..
b.	Asahi . . .	15,800	400½	75¼	27½	15,000 B.	Clydebank	1899	1900	..	9–4 H. S.	4–2½	6 H.S.	12 H.S.	14 H. S.	6 H.S.	4 *12-in.*, 14 *6-in.*, 20 *12-pr.*, 8 *3-pr.*, 4 *2½-pr.*	4 (sub.)	18	700 1549	750
a.c.	Asama . .	9700	408	67	24¼†	19,000 *t*	Elswick	1898	1899	..	7–3½ H. S.	2	5 H.S.	..	6	6 H.S.	4 *8-in.*, 14 *6-in.* (A.), 12 *12-pr.*, 8 *2½-pr.*	5 (4 sub.)	22·1 *t*	600 1409	482
,,	Aso (*ex* Bayan) .	7726	443	55¾	22	17,400 My. *t.*	La Seyne	1900	1902	..	8–3 K.S.	2	3 K.S.	..	7 K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 32 *2·9-in.*, 20 *3-pr.*, 6 *1-pr.* 3 l., and M.	2 (sub.)	22 *t*	750 11,000	..
a.c.	Chiyoda . .	2450	308	42½	14	5700 B.	Clydebank	1889	1890	..	4½	1–2	..	..	..	..	10 *4·7-in.*, 14 *3-pr.*, 3 M. .	3	17·5	420	300
b.	Fuji . . .	12,320	374	73	26½	14,000	Thames	1896	1897	..	18–6 H. S.	4–2½	4 H.S.	..	14 H. S.	6 H.S.	4 *12-in.*, 10 *6-in.*, 20 *3-pr.*, 4 *4½-pr.*	5 (4 sub.)	19·2 18·5 *t*	1100	600
,,	Hizen (*ex* Retvizan)	12,700	374	72¼	25	16,000 My.	Philadelphia	1900	1902	..	9–4 K.S.	4	6·2 K.S.	9 K.S.	10 K.S.	5 K.S.	4 *12-in.*, 6 *8-in.*, 20 *3-pr.*, 6 *1-pr.*	6	18·0	800 2000	..
,,	Ibuki . . .	14,620	450½	75½	26½	25,000 My. tur.	Kure .	1907	..	..	7–4 K.S.	2	5 K.S.	..	9 K.S.	..	4 *12-in.*, 8 *8-in.*, 12 *4·7-in.*, 3 *1·8-in.*, 2 l., 4 M.	5 (4 sub.)	22	2000	..
,,	Idzumo .	9750	400	68½	24¼†	17,300 B. *t.*	Elswick	1899	1901	..	7–3½ H.N.S.	2½	5 H.N.S.	..	6 H. N.S.	6 H.N.S.	4 *8-in.*, 14 *6-in.*, 12 *12-pr.*, 8 *2½-pr.*	4 (sub.)	22·0 21·7 *t*	600 1412	672
,,	Iwate . .							1900	1901												
b.	Iki (*ex* Nicolai I) .	9672	326	67	23	8000 B.	St. Petersburg	1888	1892	..	14–6 *comp.*	2½	..	..	10 *comp.*	6 *comp.*	2 *12-in.*, 4 *9-in.*, 8 *6-in.*, 12 Q.-F., 8 M., 4 l.	6	14·8 *t*	..	600

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a.c.	**Ikoma**	13,750	440	75	26	20,500	Kure	1906	1907	..	7-5 K.S.	..	..	..	7 K.S.	..	4 *12-in.*, 12 *6-in.*, 12 *4·7-in.*, 2 *1·8-in.*, 2 l., 4 M.	5 (4 sub.)	21·0	..	817
b.	**Iwami** (*ex* Orel)	13,516	367½	76	26	16,000 I.My.	St.Petersburg (Galerny)	1902	1904	..	9-4 K.S.	2½–1½	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 6 *8-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	2 (2 sub.)	18·0	800 2000	740
b.	**Kashima**	16,400	425	78⅛	26½	17,280 Nic.	Elswick	1905	1906	..	9-4 K.S.	3–2½	6	6	9 K.S.	6 K.S.	4 *12-in.*, 4 *10-in.*, 12 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 6 M., 2 l.	5 (sub.)	19·2 *t*	750 2150	980
a.c.	**Kasuga**	7299	344	59¾	24¼	13,500	Sestri Ponente	1902	1904	760,000	6 H.N.S.	1½	6 H.N.S.	6 H.N.S.	6 H.N.S.	6 H.N.S.	1 *10-in.*, 2 *8-in.*, 14 *6-in.*, 10 *3-in.*, 6 *1·8 in.*, 2 M.	4	20 0	600 1150	500
b.	**Katori**	15,950	420	78	27†	18,500 *t.* Nic.	Barrow	1905	1906	..	9-5 K.S.	3–2	6	6	10 K.S.	6 K.S.	4 *12-in.*, 4 *10-in.*, 12 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 6 M., 2 l.	5 (sub.)	19·5 *t*	750 1800	..
a.c.	**Kurama**	14,620	450½	75½	26¼	25,000 I.My.	Yokosuka	1907	..	..	7-4 K. S.	2	5 K.S.	..	9 K. S.	..	4 *12-in.*, 8 *8-in.*, 12 *4·7-in.*, 3 *1·8-in.*, 2 l., 4 M.	5 (4 sub.)	22·0	2000	..
b.	**Mikasa**	15,200	400	76	27¼	16,431 B.	Barrow	1900	1902	..	9-4 H.N.S.	3	6 H.N.S.	12 H.N.S.	14 H.N.S.	6 H.N.S.	4 *12-in.*, 4 *10-in.*, 10 *6-in.*, 20 *12-pr.*, 12 small, 8 M.	(4 sub.)	18·5 *t*	700 1520	935
c.d.	**Minoshima** (*ex* Seniavine)	4792	265	52½	17	5000 I.My.	St.Petersburg	1894	1895	410,000	10 H. S.	3	..	..	7-8 K. S.	..	4 *9-in.*, 4 *4·7-in.*, 6 *1·8-in.*, 8 M.	4	16·0	400	318
a.c.	**Nisshin**	7700	344	59¾	24¼	13,500	Sestri Ponente	1903	1904	760,000	6 H.N.S.	1½	6 H.N.S.	6 H.N.S.	6 H.N.S.	6 H.N.S.	4 *8-in.*, 14 *6-in.*, 10 *3-in.*, 6 *1·8-in.*, 2 M.	4	20·0	600 1150	500
c.d.	**Okinoshima** (*ex* Apraxine)	4126	277½	52½	17½	5757 *t.*	St.Petersburg (New Admiralty)	1896	1898	..	10 H. S.	3	..	..	7¾ K. S.	..	3 *10-in.*, 4 *4·7-in.*, 10 *1·8-in.*, 12 *1·4-in.*	4	15·0 *t*	215	318
b.	**Sagami** (*ex* Peresviet)	12,674	401¼	71¾	26	14,500 I.My.	St.Petersburg (Baltic)	1898	1901	..	9-7 H. S.	2¾	6 H. S.	9 H. S.	9 H. S.	6 H. S.	4 *10-in.*, 11 *6-in*, 16 *12-pr.*, 10 *3-pr.*, 17 *1-pr.*	5	18·0	800 2056	732
„	**Satsuma**	19,350	482	83½	27½	18,000 I.My.	Yokosuka	1906	..	..	9-5 K. S.	..	..	..	..	..	4 *12-in.*, 12 *10-in.*, 12 *4·7-in.*	5 (4 sub.)	20·5	..	..
„	**Shikishima**	14,850	400	75¼	26½	16,355 B.	Thames	1898	1899	..	9-4 H.N.S.	4–2½	6 H.N.S	12 H.N.S.	14	6 H.N.S.	4 *12-in.*, 14 *6-in.*, 20 *12-pr.*, 8 *3-pr.*, 4 *2½-pr.*, 8 M.	5 (4 sub.)	18·3	700 1722	741
„	**Suo** (*ex* Pobieda)	12,674	401¼	71½	26	14,500 I.My.	St.Petersburg (Baltic)	1900	1901	..	9½–4 H. S.	2¾	9 H. S.	9 H. S.	9 H. S.	6 H. S.	4 *10-in.*, 11 *6-in.*, 16 *12-pr.*, 10 *3-pr.*, 17 *1-pr.*, 2 l.	5	18·0	800 2056	732
„	**Tango** (*ex* Poltava)	10,960	367½	69	26	11,255 I.My.	St.Petersburg	1894	1898	1,098,000	15¾	3½	4	9	10 H. S.	6	4 *12-in.*, 12 *6-in.*, 40 smaller	6	16·0	900	700
a.c.	**Tokiwa**	9700	408	67	24¼†	20,556 *t.*	Elswick	1898	1899	..	7-3½ H. S.	2	5 H.S.	..	6 H. S.	6 H.S.	4 *8-in.*, 14 *6-in.* (A.), 12 *12-pr.*, 8 *2½-pr.*	5 (4 sub.)	23·0	600 1409	500
„	**Tsukuba**	13,750	440	75	26	20,500	Kure	1905	1907	..	7-5 K. S.	..	..	..	7 K. S.	..	4 *12-in.*, 12 *6-in.*, 12 *4·7-in.*, 2 *1·8 in.*, 2 l., 4 M.	5 (4 sub.)	21·0	..	817
„	**Yakumo**	9850	407¾	64¼	23¾	16,000 B.	Stettin	1899	1901	..	7-3½ H. S.	2½	5 H.S.	..	6 H. S.	6 H.S.	4 *8-in.* (A.), 12 *6-in.*, 12 *12-pr.* (A.), 8 *2½-pr.*	5 (4 sub.)	20·0	600 1100	500

* All Q.F. guns and 12 in. for new ships are Armstrong. † Mean draught. ‡ Particulars uncertain.

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JAPAN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.v.	**Akagi**	615	164	27	10	700	Yokosuka	1889	1891	..	..	..	1 *8·2-in.*, 1 *5·9-in.*, 2 l., 2 M.	..	13·0	60	113
cr.	**Akashi**	2657	295½	41¾	16½	8500	Yokosuka	1897	1898	327,000	2	4½ shield	2 *6-in.* (A.), 6 *4·7-in.*, 10 *3-pr.*, 2 *2½-pr.*, 4 M.	2	20·0	200 544	..
,,	**Akitsushima**	3150	302	42½	18¼	8400	Yokosuka	1892	1893	..	3	..	4 *6-in.*, 6 *4·7-in.*, 10 *3-pr.*	4	19·0	..	330
t.g.b.	**Chihaya**	1250	273	31½	10	5500 Nor.	Yokosuka	1900	1901	..	..	..	2 *4·7-in.*, 4 *12-pr.*	5	21·0	123 344	..
cr.	**Chitose**	4760	395	49	18	15,500	San Francisco	1898	1899	205,200	4½	4½ shield	2 *8-in.*, 10 *4·7-in.*, 12 *12-pr.*, 6 *2½-pr.*	4	22·5	350 1000	405
,,	**Hashidate***	4277	295	50¾	21¼	5400 My.	Yokosuka	1891	1893	..	2	12	1 *12·5-in.* (Canet), 11 *4·7-in.*, 5 *6-pr.*, 11 *3-pr.*, 6 M.	4	17·0	400	350
,,	**Itsukushima***	4277	295	50¾	21¼	5400 B.	La Seyne	1891	1893	..							
,,	**Kasagi**	5416	374½	48¾	19	13,492	Philadelphia	1898	1899	205,200	4½-1½	4½ shield	2 *8-in.*, 10 *4·7-in.*, 12 *12-pr.*, 6 *1·8-in.*	4	22·7 *t*	350 1000	405
t.c.	**Katsuraki**	1476	206¾	36	15	1600	Yokosuka	1885	1887	..	..	..	2 *6-in.* (K.), 5 *4·7-in.*, 2 M.	2	13·0	..	242
,,	**Musashi**																
Scout	**Magami**	1329	316	31½	9¾	8000 turbines	Sasebo	1906	..	..	2½	..	2 *4·7-in.*, 4 *12-pr.*	..	23·0	..	..
t.g.b.	**Makigumo** (*ex* Posadnik)	400	192½	24¼	7½	3600	Elbing	1892	1892	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	3	22·0	90	87
cr.	**Matsushima***	4277	295	50¾	21¼	5400 B.	La Seyne	1890	1892	..	2	12	1 *12·5-in.* (Canet), 11 *4·7-in.*, 5 *6-pr.*, 11 *3-pr.*, 6 M.	4	17·5 *t*	400	350
g.v.	**Maya**	615	164	27	10	700	Yokosuka	1886	1887	..	..	..	1 *8·2-in.*, 1 *4·7-in.*, 2 M.	..	13·0	60	113
cr.	**Naniwa***	3700	300	46	18½	7235	Elswick	1885	1886	..	3	1½ shield	2 *10·2-in.* (A.), 6 *6-in.*, 2 *3-pr.*, 10 M.	4	18·72 *t*	800	350
,,	**Niitaka**	3365	235½	44	16½	10,000 Nic.	Yokosuka	1902	1905	..	2½	..	6 *6-in.*, 10 *3-in.*, 4 *2½-pr.*	..	20·0	600	..

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cr.	**Otawa**	3000	341	42½	17	10,000 My.	Yokosuka	1903	1904	..	..	..	2 *6-in.*, 6 *4·7-in.*, 4 *12-pr.*, 2 M., 2 l.	..	20·0	600	..
t.g.b.	**Shikinami** (*ex* Gaidamak)	400	192½	24¼	7½	3000	Abo, Finland	1893	1894	..	..	..	2 *1·8-in.*, 7 *1·4-in.*, 10 M.	3	22·0	875 90	87
cr.	**Soya** (*ex* Varyag)	6500	420	52	20¾	20,000 My.	Philadelphia	1899	1900	..	3	..	12 *6-in.*, 12 *12-pr.*, 6 *3-pr.*	6 (2sub.)	23·0	770 1250	571
„	**Suma**	2657	306¾	40	16¼	8500	Yokosuka	1896	1898	237,000	2 shield	4½ 4 M.	2 *6-in.*, 6 *4·7-in.*, 12 *3-pr.*	2	20·0	200	..
„	**Sutsuya** (*ex* Novik)	3080	347	41½	16	18,000 My.	Danzig (Schichau)	1900	1902	..	2	..	2 *6-in.*, 4 *4·7-in.*	6	25·0	600	..
„	**Takao**	1774	230	33	13	2330	Yokosuka	1888	1889	..	..	..	4 *6-in.*, 1 *4¾-in.* do., 6 M.	..	15·0	300	255
„	**Takachiho***	3700	300	46	18½	7500	Elswick	1885	1886	..	3	1½ shield	2 *10·2-in.* (A.), 6 *6-in.*, 2 *3-pr.*, 10 M.	4	18·7 *t*	800	365
t.g.b.	**Tatsuta***	875	240	27½	13	5500	Elswick	1894	1894	..	..	..	2 *4·7-in.*, 4 *3-pr.*	5	21·0	200	..
cr.	**Tone**	4035	400	48½	16¾	15000 My.	Kobe	1906	..	..	2–3	..	2 *6-in.*, 12 *4·7-in.*, 2 *12-pr.*	..	23·0	..	392
	X						Sasebo	1907									
„	**Tsugaru** (*ex* Pallada)	6630	413¼	55¾	21	11,610 My.	St. Petersburg (Galerny)	1899	1902	..	2½	..	6 *6-in.*, 20 *12-pr.*, 8 *1-pr.*	4	20·0	900 1400	422
„	**Tsukushi**	1350	210	32	15	2887	Elswick	1882	1893	..	..	..	2 *10-in.* (A.), 4 *4·7-in.*, 2 l., 4 M.	2	16·5 *t*	250	190
„	**Tsushima**	3365	235½	44	16½	10,000 Nic.	Kure	1902	..	..	2½	..	6 *6-in.*, 10 *3-in.*, 4 *2½-pr.*	..	20·0	600	..
g.b.	**Uji**	620	180	27¾	10	1000 B.	Kure	1903	..	..	..	..	4 *12-pr.*, 3 M.	..	13·0	100	..
cr.	**Yayeyama***	1600	315	34½	15	6000 Nic.	Yokosuka	1889	1890	..	..	..	3 *4·7-in.*, 6 M.	2	20·0	..	200
„	**Yamato**	1476	206¾	36	15	1600	Yokosuka	1885	1886	..	..	..	2 *6·6-in.* (K.), 5 *4·7-in.*, 4 M.	2	13·0	..	242
Scout	**Yodogava**	1230	300	32	9¾	6500	Sasebo	1906	..	..	2½	..	2 *4·7-in.*, 4 *12-pr.*	..	22 0	..	..

Amakusa, mining vessel (*ex* Amur).

* Reported to have been removed from the active list.

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NETHERLANDS.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
c.d.s.t.	**De Ruyter** . .	5014	316¾	51½	21¾	6377 *t.*	Amsterdam .	1900	1904	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 9·4-*in.*, 4 5·9-*in.*, 10 2·9-*in.*, 4 1·4-*in.*	3 2 sub.	16·5 *t*	680	444
,,	**Evertsen** . . .	3464	282¾	47	16¾	4735	Flushing .	1894	1896	..	6–4 H.S.	2	..	..	9½ H.S.	3 H.S.	3 8·2-*in.*, 2 5·9-*in.*, 6 2·9-*in.*, 8 1·4-*in.*	3	16·0	280	268
,,	**Hertog Hendrik** .	5014	316¾	51½	21¾	6000 Y.	Amsterdam .	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 9·4-*in.*, 4 5·9-*in.*, 10 2·9-*in.*, 4 1·4-*in.*, 2 1.	3	16·5	680	444
t. & b.	**Jacob van Heemskerck**	5211	316¾	51½	21¾	6000 Y	Amsterdam	1906	..	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	..	2 9·4-*in.*, 6 5·9-*in.*, 10 *12-pr.*, 4 1 4-*in.*, 2 1.	3 2 sub	16·0	680	441
c.d.s.t.	**Koningin Regentes**	5014	316¾	51½	21¾	7290 Y.	Amsterdam .	1900	1902	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	..	2 9·4-*in.*, 4 5·9-*in.*, 6 2·9-*in.*, 4 1·4-*in.*, 2 1.	3 2 sub.	16·5	680	444
t. & b.	**Koningin Wilhelmina der Nederlanden** . shd.	4527	327½	48¾	20	4600	Amsterdam .	1892	1894	..	..	3	..	..	11	..	1 *11-in.*, 1 8·2-*in.*, 2 6·6 *in.*, 2 6·6-*in.*, 4 2·9-*in.*, 4 1·4-*in.*, 6 1·4-*in.*, 2 M.	4	16·5	448	293
c.d.s.t.	**Kortenaer** . .	3464	282¾	47	16¾	4658	Amsterdam .	1894	1896	..	6 H.S.	2	..	..	9½ H.S.	3 H.S.	3 8·2-*in.*, 2 5·9-*in.*, 6 2·9-*in.*, 8 1·4-*in.*	3	16·0	280	260
t. & b.	**Marten Tromp** .	5211	316¾	51½	21¾	6377 *t*	Amsterdam .	1904	1906	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 9·4-*in.*, 4 5·9-*in.*, 10 2·9-*in.*, 4 1·4-*in.*	3 2 sub.	16·5 *t*	680	444
,,	**Piet-Hein** . .	3464	282¾	47	16¾	4736 *t*	Rotterdam .	1894	1896	..	6 H.S.	2	..	..	9½ H.S.	3 H.S.	3 8·2-*in.*, 2 5·9-*in.*, 6 2·9-*in.*, 8 1·4-*in.*	3	16·2 *t*	280	260
,,	**Reinier Claeszen** .	2440	229½	44¼	15	350	Amsterdam .	1891	1892	..	4½–2 *comp.*	3	..	..	11 *comp.*	6 *comp. shield*	1 8·2-*in.* (*K.*), 1 6·6-*in.*, 1 2·9-*in.*, 4 1 9-*in.*, 3 1·4-*in.*	2	12·5 *t*	88	160
..	**Unnamed** . .	6525	..	..	..	..	..	Bldg.	..	..	..	..	..	..	..	..	2 *11-in.*, 4 6-*in.*, 10 *12-pr.*	..	16·0	..	500

Two coast defence vessels of 850 tons and three monitors of 680 tons, projected.

Coast defence monitors (launched 1868–78) Schorpioen, Stier, Matador, Draak, Luipaard, Wesp, Haai, Hyena, Panter, Bloedhond, Cerberus, Krokodil and Heiligerlee, 2200 tons to 1500 tons.

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NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	inches.	inches.			knots.	tons.	
y. v.	Assahan (I)	787	179	30¾	11½	1353	Rotterdam	1900	1900	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	120	95
„	Borneo (I) . . shd.	787	179½	31	13¼	1040	Glasgow	1892	1893	..	..	..	6 *4·1-in.*, 1 *2·9-in.*, 2 *1·4-in.*, 2 M	..	13·0	124	106
„	Edi (I)	787	179½	30¾	11¾	1100	Flushing	1897	1898	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	113	95
cr.	Friesland . .	3847	307	49	17¾	10,000 Y.	Rotterdam	1896	1898	285,700	2	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 8 *1·4-in.*, 4 smaller.	4	19·8 *t*	400	333
„	Gelderland . .	3969	310¾	49	17¾	10,000 Y.	Feijenoord	1898	1900	..	2½	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 4 M.	4	20·0	850	333
„	Holland . . .	3847	307	49	17¾	10,000 Y.	Amsterdam	1896	1898	285,700	2	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 8 *1·4-in.*, 4 M.	4	19·6 *t*	400	333
„	Koetei (I) . . .	778	179	30¾	11½	1412	Amsterdam	1898	1899	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	120	97
„	Lombok (I) . . shd.	591	176	27¼	11	990	Amsterdam	1891	1892	..	..	..	3 *4·7-in.*, 1 *2·9-in.*, 2 *3-pr.*	..	12·0	55	84
„	Mataram (I) . .	797	179½	30¾	11¾	1100	Amsterdam	1896	1897	..	..	..	3 *4·7-in.*, 2 *3-in.*, 2 *1·4-in.*	..	13·0	113	95
„	Nias (I) . . .	797	179½	30¾	11¾	1227	Amsterdam (Huygens)	1895	1896	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	120	95

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NETHERLANDS.—Cruising Ships—*continued.*

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Noord-Brabant	3969	310¾	49	17¾	10,000 I.Y.	Flushing	1899	1901	..	2½	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 4 M.	4	20·0	850	333
„	Serdang (I)	797	179½	30¾	11¾	1100	Flushing	1897	1898	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	113	95
g.v	Siboga (I)	778	179	30¾	11½	1395	Amsterdam	1898	1899	..	..	..	3 *4·7-in.*, 2 *2·9-in.*, 4 *1·4-in.*	..	13·0	120	95
cr.	Sumatra (I)	1693	229½	37	14	3750	Amsterdam	1890	1892	..	1½	..	1 *8·2-in.*, 1 *5·9-in*, 2 *4·7-in.*, 1 *2·9-in.*, 4 *3-pr.*, 2 M.	..	17·0	225	183
g.v	Sumbawa (I)	591	176	26½	11½	930	Flushing	1891	1892	..	..	..	3 *4 7-in.*, 1 *2·9-in.*, 2 *3-pr.*	..	12·5 *t*	60	84
cr.	Utrecht	3969	310¾	49	17¾	10,000	Amsterdam	1898	1900	..	2½	..	2 *5·9-in.*, 6 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in*, 4 M.	4	20·0	850	333
„	Zeeland	3847	307	49	17¾	10,589 I.Y. *t*	Flushing	1897	1898	285,700	2	..	2 *5 9-in.*, 6 *4·7-in.*, 4 *2·9 in.*, 8 *1·4-in.*, 4 M.	4	19·4 *t*	400	333

Gun-vessels of the Indian Navy: Arend, Flamingo, Raaf, Reiger, Zeeduif, Zwaan, Pelikaan, Condor, Gier, Zeemeeuuw, Zwaluw (400 tons), launched between 1880 and 1891; Java (1279 tons), 1885; Ceram and Flores (541 tons), 1887; Glatik (417 tons), 1894; Havik, Snip, Sperwer, Kwartel, Favant, and Valk between 1894 and 1903; Argus and Cycloop (438 tons), 1893.

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NORWAY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.		Guns.	Torpedo Tubes.			
															Heavy Guns.	Secondary.					
		tons.	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	Eidsvold .	3847	290	50½	16½	4500 Y.	Elswick	1900	1901	350,000	6 H.N.S.	2	..	..	6 H.N.S.	6 H.N.S.	2 *8·2-in.*, 6 *5·9-in.*, 8 *12-pr.*, 6 *3-pr.*	2 sub.	16·5 *t*	400 600	261
c.d.s.	Norge .																				
„	Harald Haarfagre . .	3556	280	48½	16½	3700	Elswick	1896	1898	300,000	7 H.S.	2	..	..	8 H.S.	..	2 *8-in.*, 6 *4·7-in.*, 6 *12-pr.*, 6 *1½-pr.*	2 sub.	17·2 *t*	200 500	248
„	Torkenskjold							1897	1899												

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.b.	Æger . .	387	108½	29⅓	8	450	Horten .	1892	1893	..	1½	..	1 *8·2-in.*, 1 *2·7-in.*, 2 *1·9-in.* . .	..	9·0	..	43
g.v.	Ellida . .	984	187	32¾	14¼	900	Horten .	1880	1881	..	..	..	5 *5·9-in. 4-ton* (K.), 1 *4·7-in.*, 1 l., 2 M. .	1	12·0	97	128
„	Frithjof . .	1349	216½	32¾	13¼	300	Horten .	1896	1898	..	..	..	2 *4·7-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 2 l. .	3	15·0	120	156
„	Heimdal . .	620	167½	26¾	11¾	700	Christiania .	1892	1893	..	..	..	4 *2·5-in.*	sub. ..	12·0	92	62
to.g.b.	Valkyrien. .	374	190	24¼	9¼	3300	Elbing. .	1896	1897	..	..	..	2 *2·7-in.*, 1 M. . . .	2	23·2 *t*	90	57
g.v.	Viking . .	1095	203½	30½	13	† 2000	Horten .	1891	1892	..	1½	..	2 *5·9-in.* (A.), 4 *2·5-in.*, 4 *1·4-in.*, 2 M. .	3	15·0	140	156

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.H.P., armed with one large gun and machine guns in each.

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PORTUGAL.—Armoured Ship.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
b.	**Vasco da Gama**	2972	233	40	18¼	6000 W.T.	Blackwall Leghorn	1876 1903	1878	132,000	9¾-4	3	6 K.S.	..	7¾ K.S.	..	2 *8-in.*, 4 *4·7-in.*, 2 *2·5-in.*, 2 *1-pr.*, 4 M.	2 (sub.)	15·5 *t*	300	218

The Vasco da Gama was reconstructed by Messrs. Orlando at Leghorn.

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	**Adamastor**	1962	250	35	14	4000	Leghorn	1896	1897	..	3	5	2 *5·9-in.*, 4 *4·7-in.*, 4 *2·2-in.*, 4 M.	3	18·0 *t*	270	232
corv.	**Diu**	717	147	27½	13	700	Lisbon	1889	1891	..	..	..	1 *5·9-in.* (K.), 2 *4·7-in.*, 1 *3-pr.*, 2 M.	..	12·0	80	114
cr.	**Dom Carlos I.**	4100	360	46½	17½	12,500 Y.	Elswick	1898	1899	..	4	..	4 *5·9-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 6 *1-pr.*, 4 M.	5 (3 sub.)	22·0	1000	260
g.v.	**Dom Luiz I.**	710	151	27¼	13¾	512	Lisbon	1895	1896	..	..	..	4 *4·1-in.*, 3 *2·5-in.*, 3 M.	..	9·9	100	..
„	**Liberal**	580	140	25½	10½	580	Birkenhead	1884	1886	32,500	..	..	1 *6-in. 4-ton* (A.), 3 *4-in.*, 2 M.	..	11·0	90	109

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g.v.	**Patria**	620	196¾	27½	8½	1800	Lisbon	1903	..	..	..	..	4 *4-in.*, 6 *1·8-in.*	..	15·0	..	..
cr	**Rainha Amelia**	1640	246	36	14⅜	5000 Nor.	Lisbon	1899	1901	..	1	..	4 *5·9-in.*, 2 *3·9-in.*, 2 *3-pr.*, 4 M.	2	20·6 *t*	..	250
,,	**São Gabriel** / **São Rafael**	1772	246	35½	14½*	4000 N.S.	Havre	1898	1899	..	1½	..	2 *5·9-in.* (*Canet*), 4 *4·7-in.*, 8 *1·8-in.*, 2 M.	1	17·5 *t*	500	200
to.g.b.	**Tejo**	522	229½	23	..	7000	Lisbon	1901	1902	..	..	..	1 *8-in.*, 6 *1·8-in.*	3	25·0	..	85
g.b.	**Zaire**	580	140	25½	10½	580	Birkenhead	1884	1885	32,500	..	..	1 *6-in.* (A.), 3 *4-in.*, 2 M.	..	11·0	90	109
,,	**Zambeze**	627	143	25⅜	12	500	Lisbon	1886	1887	..	..	..	1 *6-in.* (A.), 2 *4-in.*, 2 M.	..	10·0	85	107

* Mean draught.

Eighteen small gunboats and about 29 light-draught steel river-gunboats. Two gunboats of 220 tons, the Al. Baptista de Andrade and Thomaz Andrea for Mozambique and Timor.

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RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkheads.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Admiral Makaroff** .	7900	443	75¾	23	16,500 B.	La Seyne .	1906	1907		6¾–4 K.S.	2	3 K.S.	6¾ K.S.	5¾ K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 20 *12-pr.*, 4 *6-pr.*	5 sub.	22·5 *t*	750 / 1020	573
b.	**Alexander II** . shd.	9244	326	67	23	8000	St. Petersburg.	1887	1890	..	14–6 *comp.*	2½	..	6 *comp.*	10 *comp.*	6 *comp.*	2 *12-in.*, 4 *9-in.*, 8 *6-in.*, 4 *6-pr.*, 4 *3-pr.*, 6 M.	5	16·5 *t*	1200	604
b.	**Andrei Pervozvannyi**	17,200	429¾	79¾	28½	17,600 B.	St. Petersburg. (Galerny)	1906	..	1,170,000	11–6 K.S.	2½	5 K.S.	..	12 K.S.	7 K.S.	4 *12-in.*, 12 *8-in.*, 20 *4·7-in.*, 14 smaller	5 4 sub.	18·0	1500	..
a.c.	**Bayan** . . .	7900	443	75¾	23	16,500 B.	St. Petersburg (New Admiralty)	1907	..	..	6¾–4 K.S.	2	3 K.S.	6¾ K.S.	5¾ K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 20 *12-pr.*, 4 *6-pr.*	5 sub.	21·0	750 / 1020	573
b.	**Cesarevitch** . .	12,912	388¾	76¼	26½	16,300 B.	La Seyne .	1901	1902	..	9¾–4 K.S.	2½	6 K.S.	9 K.S.	10–11 K.S.	6¾ K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *1·8-in.*, 6 *1·4-in.* 4 M., 2 l.	4 2 sub.	19·6 *t*	900 / 1350	732
t.	**Dvenadzat Apostoloff** (Twelve Apostles), B.S.	8433	330	60	26	11,500	Nicolaieff .	1890	1892	..	14–6 *comp.*	2½	10 *comp.*	12 *comp.*	12 *comp.*	5 *comp.*	4 *12-in.*, 4 *6-in.*, 8 *3-pr.*, 10 M.	6	16·6 *t*	800	500
b.	**Evstafi**, B.S. . .	12,733	372¼	72¾	27	10,600 B.	Nicolaieff .	1906		..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	10 K.S.	5 K.S.	4 *12-in.*, 16 *6-in.*, 14 *3-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 6 M., 2 l.	5	16	670 / 1400	731
b.	**Georgi Pobiedonosetz** B.S.	10,280	320	69	26½	10,600 13,468 *t*	Sebastopol .	1892	1896	*431,000	16–11	..	12	..	12	..	6 *12-in.*, 7 *6-in.*, 8 *3·9-in.*, 6 M.	7	16·5 *t*	700	500
a.c.	**Gromoboi** . . shd.	12,336	473	68½	26	14,500	St. Petersburg (Baltic)	1899	1900	..	6 H.S.	3	4¾ H.S	6 H.S.	6 H.S.	4¾ H.S.	4 *8-in.*, 16 *6-in.*, 6 *4·7-in.*, 20 *3-in.*, 36 small Q.F. and M.	4 4 sub.	20·0	2500	814
a.g.b.	**Grozjastchy** . .	1492	229	41¾	11	2000 B.	St. Petersburg	1890	1891	..	5	1½	..	3½	..	..	1 *9-in.*, 1 *6-in.*, 8 Q.F.	2	15·0	100	120

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b.	**Ioann Zlatoust**, B.S. .	12,733	372½	72¾	27	10,600 B.	Sebastopol	1906	..	..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	12–10 K.S.	5 K.S.	4 *12-in.*, 16 *6-in.*, 14 *3-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 6 M., 2 l.	5	16·0	670† 1400	636
a.g.b.	**Khrabry** . . .	1492	229	41¾	11	3000 Nic.	St. Petersburg (New Admiralty)	1895	1896	..	5	1½	..	3½	..	..	1 *9-in.*, 1 *6-in.*, 8 Q.F.	2	15·0	100	120
a.c.	**Pallada** . . .	7900	443	75¾	23	16,500 B.	St. Petersburg (New Admiralty)	1906	..	..	6¾–4 K.S.	2	3 K.S.	6¾ K.S.	5¾ K.S.	3 K.S.	2 *8-in.*, 8 *6-in.*, 20 *12-pr.*, 4 *6-pr.*	5 sub.	21·0	750 1020	573
2nd cl. *cr*	**Pamyat Azova** shd. .	6734	377	51	23	8000 B.	St. Petersburg	1888	1890	350,000	9 *comp.*	2½	..	8 *comp.*	8 *comp.*	..	2 *8-in.*, 13 *6-in.*, 14 Q.F., and 3 M.	3	18·8 ‡	1000	525
b.	**Panteleimon**, B.S. (*ex* Potemkine)	12,480	372½	72¾	27	10,600 B.	Nicolaieff .	1900	1902	..	9-3 K.S.	2½	6 K.S.	7–5 K.S.	12–10 K.S.	5 K.S.	4 *12-in.*, 16 *6-in.*, 14 *3-in.*, 6 *1·8-in.*, 14 *1·4-in.*, 6 M., 2 l.	5 sub.	17·0	670†	636
b.	**Pavel I** (Imperator) .	17,200	429¾	79¾	28½	17,600 B.	St. Petersburg (Baltic)	1907	..	1,170,000	11–6 K.S.	2½	5 K.S.	..	12 K.S.	7 K.S.	4 *12-in.*, 12 *8-in.*, 20 *4·7-in.*, 14 smaller.	5 4 sub.	18·0	1500	..
a.c.	**Rossia** . . shd.	12,130	480	68½	26	14,500 B.	St. Petersburg	1896	1898	..	10–5 H.S.	2½	4 H.S.	6 H.S.	2 H.S.	2 H.S.	4 *8-in.*, 16 *6-in.*, 12 *3-in.*, 36 small Q.F. & M.	5	20·0	2500 §	725
b.	**Rostislav**, B.S. . .	8880	341	66½	24	8500	Nicolaieff .	1896	1899	..	15¾–8 H.S.	2-3	5 H.S.	5 H.S.	15¾ H.S.	6 H.S.	4 *10-in.*, 8 *5·9-in.* (Canet), 12 *1·8-in.*, 4 *1·5-in.*, 2 M.	6	16·0	§550 800	624
a.c.	**Rurik** . . .	15,170	490	75	26	19,700 B.	Barrow .	1906	1907	..	6–3 K.S.	1½	3 K.S.	3 K.S.	8 K.S.	7 K.S.	4 *10-in.*, 8 *8-in.*, 20 *4·7-in.*, 18 smaller.	2 sub.	21·0	1200 2000	800
b.	**Sinope**, B.S. . .	10,180	331	69	26½	13,000 B.	Sebastopol .	1887	1890	900,000	16–11 *comp.*	3	14 *comp.*	12	14 *comp.*	..	6 *12-in.*, 7 *6-in.*, 8 Q.F., 6 M.	7	16·75	886	325
b.	**Slava** . . .	13,516	367½	76	26	16,000 B.	St. Petersburg (Baltic)	1903	1906	..	9-4 K. S.	4	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	4 2 sub.	18·0	1250 2000	740
b.	**Tria Sviatitelia**, B.S.	13,318	357½	72½	27	10,600	Nicolaieff .	1893	1896	..	16 H.S.	3	16 H.S.	12 H.S.	16 H.S.	5 H.S.	4 *12-in.*, 8 *6-in.*, 4 *4·7-in.*, 56 smaller Q.F. & M.	6 2 sub.	18·0 ‡	1000	582

Exclusive of armament.

† And liquid fuel, 580 tons.

§ And liquid fuel.

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RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
to.g.b.	**Abrek**	535	212½	24¾	9	4506	Abo	1896	1897	53,600	½	..	2 *3-in.*, 4 *1·8-in.*	2	21·2	..	..
2nd cl. *cr.*	**Admiral Korniloff**	5800	351	48½	20	9000 *t*	St. Nazaire	1887 1895	1889	296,000	2½	..	14 *6-in.*, 6 *1·8-in.*, 6 *1·4-in.*, 5 l.	5	17·5 *t*	1100	425
3rd cl. *cr.*	**Almaz**	3285	325	43½	17½	7500 B.	St. Petersburg (Baltic)	1903	1903	..	2¾	5–3½ K.S.	6 *4·7-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 3 M.	6	19·0	560	340
2nd cl. *cr.*	**Askold**	5905	426½	49¼	20¾	24,000 T.S.	Kiel (Germania)	1900	1901	..	3	4	12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 2 M.	6 (2 sub.)	23·8 *t*	720 1100	500
„	**Aurora**	6731	413¼	55¾	21	11,610 B.	St. Petersburg (Galerny)	1900	1902	..	2½	..	8 *6-in.*, 20 *3-in.*, 8 *1·4-in.*	3	20·0	900 1400	422
g.b.	**Bobr**	875	215½	35¾	9	800	St. Petersburg (New Admiralty)	Bldg.	..	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170
2nd cl. *cr.*	**Bogatyr**	6645	416¾	54½	20¾	20,300 Nor.	Stettin (Vulcan)	1901	1901	..	2	5 N.S.	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*, 2 *1·4-in.*, 2 M.	6 (2 sub.)	24·0 *t*	720 1100	580
to.g.b.	**Captain Sacken, B.S.**	742	210	24	8¾	3400	Nicolaieff	1888	1889	40,700	..	..	7 *4·7-in.*, 7 M.	3	18·5 *t*	97	120
g.v.	**Chernomoretz, B.S.**	1224	210	35	11	1500 B.	Nicolaieff	1889	1891	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·5 *t*	250	161
2nd cl. *cr.*	**Diana**	6630	413½	55¾	21	11,610 B.	St. Petersburg (Galerny)	1899	1902	..	2½	..	8 *6-in.*, 20 *3-in.*, 8 *1·4-in.*	3	20·0	900 1400	422
g.v.	**Donetz, B.S.**	1224	210	35	11	1500 B.	Nicolaieff	1887	1888	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·5 *t*	250	161
g.b.	**Gilyak**	875	215½	35¾	9	800	St. Petersburg (New Admiralty)	1906	..	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170
to.g.b.	**Griden, B.S.**	400	192½	24¼	7½	3500	Nicolaieff	1893	1894	66,600	..	..	2 *1·8-in.*, 7 *1·4-in.*, 10 M.	2	22·0	90	60
3rd cl. *cr.*	**Jemchug**	3106	347¾	41½	16	17,000 Y.	St. Petersburg (Nevsky)	1903	1904	..	2	..	8 *4·7-in.*, 6 *1·8-in.*, 2 *1·4-in.*, 1 M.	3	23·0	600	340
2nd cl. *cr.*	**Kagul, B.S.**	6645	439	54½	20½	19,500	Nicolaieff	1903	1905	..	2¾	5–3½ K.S.	4 *8-in.*, 6 *6-in.*, 12 *3-in.*, 6 *1·8-in.*	2 (2 sub.)	23·0	720	..
to.g.b.	**Kazarsky, B.S.**	400	190	24	8½	3500	Elbing	1890	1891	32,500	..	..	9 *1·8-in.* (Hotchkiss)	2	23·0	90	60
g.b.	**Khivinetz**	1340	230	36	10½	1400 B.	St. Petersburg (New Admiralty)	1904	1905	..	..	..	2 *8-in.*, 8 *3-in.*, 4 M.	..	13·0	..	200

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g.b.	**Koreiets**	875	215½	35¾	9	800	St. Petersburg (New Admiralty)	1906	..	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170
g.v.	**Kubanetz, B.S.**	1224	210	35	11	1500 B.	Sebastopol	1888	1889	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F.	2	13·8 *t*	250	161
to.g.b.	**Lieutenant Ilyin**	714	230	24	8¾	3500	St. Petersburg	1887	1888	40,150	..	..	7 *3-pr.*, 10 M.	5	20·1 *t*	97	120
2nd cl. *cr.*	**Oleg**	6675	439¾	54½	20½	19,500 Nor.	St. Petersburg (New Admiralty)	1903	1904	..	2¾	5–3½	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*	2 sub.	23·0	600	340
„	**Otchakoff, B.S.**	6645	439	54½	20½	19,500 Nor.	Sebastopol	1902	1905	..	2¾	5–3½ K.S.	12 *6-in.*, 12 *3-in.*, 6 M.	2 sub.	23·0	720 1100	..
g.b.	**Sivoutch**	875	215½	35¾	9	800	St. Petersburg (New Admiralty)	1906	..	..	..	..	2 *4·7-in.*, 4 *12-pr.*, 3 M.	1	12·0	60	170
3rd cl. *cr.*	**Rynda**	3508	265¾	46	16	3000	St. Petersburg.	1885	1887	..	1½	..	4 *6-in.*, 9 Q.F., M., & 4 l.	..	14·8 *t*	710	322
corv.	**Strjelok**	1343	206¾	32¾	14	1528	St. Petersburg.	1880	1881	..	..	..	3 *6-in.*, 7 Q.F., M., & 4 l.	..	13·0	250	172
g.v.	**Teretz, B.S.**	1224	210	35	11	1500 B.	Sebastopol	1888	1889	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·8 *t*	250	161
„	**Uraletz, B.S.**	1224	210	35	11	1500 B.	Sebastopol	1888	1890	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·8 *t*	250	161
cr.	**Vitiaz**	6375	414	52½	20¾	20,000 B.	St. Petersburg (Galerny)	Bldg.	..	..	2¾	5–3½ K.S.	12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*	5 (2 sub)	23·0	720	..
to.g.b.	**Voevoda**	400	192½	24½	7½	3600	Elbing	1892	1893	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	2	22·0	90	87
g.v.	**Zaporojetz**	1224	210	35	10	1500	Nicolaieff	1887	1889	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·5 *t*	250	161

Okean, *coal transport*, 12.000 tons, 18 knots, launched at Kiel, 1901. Torpedo transports and mining vessels Volga and Bakan. Mining vessels Yenessei and Amour in hand at St. Petersburg.

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Auxiliary Steamers.

NAME.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Date of Launch.	Speed.
VOLUNTEER FLEET.	tons.	ft. in.	ft. in.	ft. in.				
Petersburg	9252				2		1894	19
Don (*ex* Fürst Bismarck)	8430				2	16,410	1890	19
Kiev	10,500	440 0	49 6	24 0	2	3200	1895	13
Kuban (*ex* Auguste Victoria)	8480				2	12,000	1889	18½
Lena (*ex* Kherson)	10,225				2	13,100	1898	19½
Nijni Novgorod	7876	325 0	40 0	23 6	1	2000	1891	11½
Smolensk	11,850				2		1901	20
Saratoff	8556	462 0	50 0	24 0	2	10,000	1892	19
Tamboff	8640	385 0	45 0	24 6	1	2,500	1893	12¾
Terek (*ex* Columbia)	7241				2	13,680	1889	18½
Vladimir	10,500	440 0	49 6	24 0	2	3,200	1895	12
Voronej	10,500	440 0	49 6	24 0	2	3,200	1895	12
Yaroslav	8640	385 0	45 0	24 6	1	2,500	1893	12¾

The vessels of the Black Sea Shipping Company are available for transport purposes.

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SPAIN.—Armoured Ships.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position.		Guns.	Torpedo Tubes.			
															Heavy Guns.	Secondary.					
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	**Cataluña** . .	6889	347¾	61	21¾	15,000	Cartagena .	1900	..	600,000	12–10	2	..	12	10½	..	2 *11-in.*, 10 *5·5-in.*, 2 *2·7-in.*, 4 *2·2-in.*, 4 *1·4-in.*, 2 M.	5 sub.	20·0	1200	484
„	**Emperador Carlos V**	9089	380	67	25	18,500	Cadiz (Vea Murguia)	1895	1898	734,000	2	6½–2	2	..	10	2	2 *11-in.* (Hontoria), 8 *5·5-in.*, 4 *3·9-in.*, 2 *2·7-in.*, 4 *2·2-in.*, 6 M.	6	20·0	1200	535
br.	**Numancia** .	7190	314¾	55¾	25½	3708	La Seyne .	1863 1897	1865	315,600	5½	..	4¾	..	5	4¾	4 *8-in.*, 4 *6·2-in.*, 10 *5·9-in.* .	2	8·0	1100	600
b.	**Pelayo** . .	9744	330	66	25	9000 Nic.	La Seyne .	1887 1897	1890	..	17¾	4	..	..	19¼	4 H.S.	2 *12·5-in.*, 2 *11-in.*, 9 *5·5-in.*, 6 smaller, 12 M.	7	16·0	800	600
a.c.	**Princesa de Asturias**	6889	347¾	61	21¾	15,000	Carraca .	1896	..	600,000	12–10	2	..	12	10½	..	2 *11-in.*, 10 *5·5-in.*, 2 *2·7-in.*, 4 *2·2-in.*, 4 *1·4-in.*, 2 M.	5	20·0	1200	500

Three battleships projected.

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SPAIN.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
to.g.b.	Don Alvaro de Bazán	810	233	26¾	22	2500	Ferrol	1897	1899	..	..	..	2 *4·7-in.* (Hontoria), 4 *1·6-in.*, 2 M.	4	19·0	..	110
„	Doña María de Molina	810	233	26¾	22	2500	Ferrol	1896	1898								
cr.	Extremadura	2030	290	36	14	7000 T	Cadiz	1900	1902	..	2	..	8 *4-in.* (Vickers), 4 *2·2-in.*, 2 *1·4-in.*, 1 l.	..	20·0	..	..
„	Lepanto	4750	318½	50½	20	12,000	Cartagena	1892	1895	..	4¾	..	4 *7·8-in.* (Hontoria), 6 *4·7-in.*, 6 *6-pr.*, 4 *3-pr.*, 5 M.	5	20·0	1100	276
to.g.b.	Marqués de la Victoria	810	233	26¾	22	2500	Ferrol	1897	1900	..	..	..	2 *4·7-in.* (Hontoria), 4 *1·6-in.*, 2 M.	4	19·0	..	110
g.v.	Marqués de Molíns	562	190	23	10¼	2600	Ferrol	1891	1893	..	..	..	2 *4·7-in.* (Hontoria), 4 *2·2-in.*, 1 M.	2	12·0	106	80
„	Martin Alonso Pinzón							1892	1893								
„	Nueva España	620	190	23	11¾	2600	Carraca	1889	1890	..	..	..	2 *4·7-in.* (Hontoria), 4 *2·2-in.*	2	14·0	106	91
cr.	Reina Regente	5287	337	529	19¾	6500 W.T.	Ferrol	1906	..	..	..	3	10 *5·5-in.*, 12 *2·2-in.*, 2 l., 8 M.	3	20·0	..	..
„	Rio de la Plata, shd.	1773	246	35¼	15	7100 N.S.	Havre	1898	1899	..	..	1	2 *5·5-in.*, 4 *3·9-in.*, 4 *2·2-in.*, 6 M.	2	20·0	270	213
g.v.	Temerario	562	190	23	10¼	2600	..	1889	1890	..	..	..	2 *4·7-in.* (Hontoria), 4 *2·2-in.*, 1 M.	2	15·0	106	82
„	Vincente Yáñez Pinzón	562	190	23	10¼	2600	Ferrol	1891	1892	..	..	..	2 *4·7-in.* (Hontoria), 4 *2·2-in.*, 1 M.	2	12·0	106	80

Hernán Cortés, Vasco Nuñez de Balboa, Ponce de Léon, MacMahon, Perla, Destructor, gunboats.

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SWEDEN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s., t.	**Aeran** . .	3612	287	49¼	16½	6500 Y.	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	17·2 *t*	370	250
„	**Dristigheten** .	3445	285	48½	16	5400 Y	Gothenburg	1900	1901	..	8 K.S.	1⅞	..	..	8 N.S.	3¾ K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 M.	2 sub.	16·5	300	250
a.c.	**Fylgia** . .	4100	377½	48¾	16	12,440 Y. *t*	Stockholm .	1905	1907	385,700	4 K.S.	2	..	..	5 K.S.	..	8 *5·9-in.*, 14 *2·2-in* , 3 *1·4-in.* .	2	22·5 *t*	350 900	321
c.d.s., t.	**Göta** . .	3238	258½	48	16¾	4750	Gothenburg	1890 1902	1891	..	11¾-8	2	..	..	7½ H.S.	5 H.S.	2 *10-in.*, 4 *6-in.*, 5 *2·2-in.*, 8 M.	3	16·0	240	150
„	**Manligheten** .	3612	287	49¼	16½	7400 Y.	Malmö .	1904	..	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	17·0	370	250
„	**Njord** . .	3445	278¼	48½	17½	5350	Gothenburg	1898	1899	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 *9·8-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 4 M.	1	16·5	275	200
„	**Oden** . .	3445	278¼	48½	17½	5330	Stockholm .	1896	1898	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 *9·8-in.*, 4 *4·7-in.*, 10 *2·2-in.*, 4 M.	1	16·5	275	200
„	**Oskar II** .	4203	313¾	49½	16¾	8500 Y.	Gothenburg	1905	1907	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 *8·2-in.*, 8 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	18·0	350 500	326
„	**Svea** . .	3051	248¼	49¼	17	3640	Gothenburg	1886 1904	1887	..	11¾-8	2	..	..	11½	..	2 *10-in.* (A.), 4 *4·7-in.*, 6 *2·2-in.*, 8 M.	1	14·7 *t*	220	268
„	**Tapperheten** .	3612	287¼	49¼	16½	6000 Y.	Malmö .	1901	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	16·5	370	250
„	**Thor** . .	3445	278¼	48½	17½	5350	Stockholm .	1898	1890	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 *9·8-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 4 M.	1	16·5	275	200
„	**Thule** . .	3248	260¾	48	16¾	4740	Stockholm .	1892 1904	1894	..	11¾-8	1⅞	..	..	11½	..	2 *10-in.* (A.), 4 *6-in.*, 5 *2·2-in.*, 8 M.	2	16·2 *t*	250	165
„	**Wasa** . .	3612	287	49¼	16½	6000 Y.	Stockholm .	1901	1893	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 *8·2-in.*, 6 *5·9-in.*, 10 *2·2-in.*, 2 *1·4-in.*, 2 M.	2 sub.	16·5	370	250
„	2 Unnamed. .	7500	..	..	..	17,500 Y.	..	Pro.	..	..	8	..	..	..	..	..	4 *11-in.*, 4 *7·6-in.*, 11 *4-in.*, 4 *1-pr.*	2 sub.	21·0	800	450

The old coast-defence ships John Ericsson, Thordön, and Tirfing, 1500 tons, Loke, 1600 tons, and the armoured gunboats Berserk, Björn, Folke, Gerda, Hildur, Sölve and Ulf, 460 tons. Some of these are being partially modernized.

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SWEDEN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.										knots.	tons.	
to.g.b.	Claes Horn . .	787	222	27	10¼	3600	Stockholm .	1899	1900	..	..	..	2 *4·7-in.*, 4 *2·2-in.* . .	1 sub.	20·0	..	100
„	Claes Uggla . .	787	232	27½	8¾	4500 Y.	Stockholm .	1900	1901	..	..	..	2 *4·7-in.*, 4 *2·2-in.* . .	1	20·5	..	100
g.v.	Edda	549	183¾	27	10¼	960	Carlskrona .	1885	1886	..	..	..	1 *10·6-in.*, 1 *6-in.*, 2 *1·5-in.*, 2 M.	..	13·6 *t*	80	76
to.g.b.	Jacob Bagge	787	222	27	10¼	3970	Malmö . .	1898	1899	..	..	..	2 *4·7-in.*, 4 *2·2-in.* . . .	1 sub.	19·5	..	100
	Örnen . .					4100	Gothenburg .	1896	1897						19·5		
„	Psilander . .	787	232	27½	8¾	4500 Y.	Stockholm .	1900	1901	..	..	..	2 *4·7-in.*, 4 *2·2-in.* . .	1 sub.	20·5 *t*	..	100

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in. B.L.R. and 2 M.

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TURKEY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
c.b.	**Assar-i-Tewfik***	4613	272½	52½	25	3560	La Seyne	1868	1870 1906	..	8	..	..	..	6	..	3 *5·9-in.*, 7 *4·7-in.*, 6 *6-pr.*	..	13·0	400	..
„	**Messoudieh**	9120	331½	59	25¾	11,000 Nic.	Thames & Genoa	1874	1876 1901	..	12	1	12	..	6–9	12	2 *9·2-in.*, 12 *6-in.*, 14 *3-in.*, 10 *6-pr.*, 2 *3-pr.*, 2 l.	..	17·5 *t*	600	..

* Refitted at Kiel, 1906.

TURKEY.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	**Abdul Hamid**	3800	340	47½	16	12,500 Nic.	Elswick	1903	1904	..	4–1½	..	2 *6-in.*, 8 *4·7-in.*, 6 *1·8-in.*, 6 M.	2	22·2 *t*	600	300
to. cr.	**Berk-i-Satvet**	740	262½	27½	..	5100	Kiel (Germania)	1906	1907	..	..	..	2 *4-in.*, 6 *6-pr.*, 2 M., 2 l.	3	22	240	..
„	**Heibetnuma**	1960	226	37	14	2500 ind.	Turkey	1890	1893	..	..	..	3 *5·9-in.* (K.), 6 *4·7-in.*, 6 Q.F.	2	14·0	..	..
g.v.	**Lutfi-Hamayoun**	1313	210	35	14	2800	Turkey	1892	1894	..	..	..	4 *6-in.* (K.), 6 *4·7-in.*, 6 Q.F.	2	13·0	..	..
„	**Abdul Medjidieh**	3432	331¼	42	16	12,000 Nic.	Philadelphia	1903	1904	..	4–1½	..	2 *6-in.*, 8 *4·7-in.*, 6 *1·8-in.*, 6 M.	2	22·2	600	300
to. cr.	**Peik-i-Shevket**	740	262½	27½	..	5100	Kiel (Germania)	1906	1907	..	..	..	2 *4-in.*, 6 *6-pr.*, 2 M., 2 l.	3	22	240	..
„	**Pelenk-i-deria**	840	236¼	31	16½	5000	Gaarden	1890	1891	..	..	½	2 *4-in.* (K.), 16 M.	2	20·0	..	111
g.v.	**Sedul Bahr**	800	173½	26½	11½	160	Turkey	1894	1897	..	2	..	4 *4·7-in.* (K.), 6 M.	2	12·7	120	..
to. g.b.	**Shahani-deria**	450	200	23	9	3000	Turkey	1892	1894	..	..	..	2 *4·7-in.* (K.), 6 M.	4	22·0	..	..
g.v.	**Zuhaf**	800	173½	26½	11½	160	Turkey	1894	1896	..	..	..	4 *4·7-in.* (K.), 6 M.	2	12·7	120	..

Despatch vessel Mermeris (450 tons) launched 1907.

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UNITED STATES.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
t.	Alabama. ✓	11,565	368	72¼	26	11,207 *t*	Philadelphia	1898	1900	544,539	16½–4 H.S.	2¾–4	5½ H.S.	12 H.S.	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 12 *6-pr.*, 11 *1-pr.*, 4 M., 2 l.	4	17·0 *t*	800 1275	592
c.d.s., *t.* (1 t.)	Arkansas ✓.	3235	252	50	12¾	1739 T.	Newport News	1900	1902	197,267	11–5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	12·0 *t*	400	222
a. c.	Brooklyn. .	9215	400½	62	26¼	18,425	Philadelphia	1895	1896	613,583	3 H.S.	6–3	4 H.S.	..	8 H.S.	5½ H.S.	8 *8-in.*, 12 *5-in.*, 12 *6-pr.*, 4 *1-pr.*, 4 M., 2 l.	..	22·2 *t*	900 1622	718
,,	California ✓.	13,680	502	69½	24½	23,000 B. & W.	S. Francisco.	1904	1907	756,000	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 (sub.)	22·0	900 2000	829
,,	Charleston ✓.	9700	424	66	25½	27,200 B.&W.	Newport News	1904	1906	563,030	4 H.S.	3	4 H.S.	..	4 H.S.	..	14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·0	650 1500	664
,,	Colorado. ✓.	13,680	502	69½	24½	26,837 Nic.	Philadelphia	1903	1905	756,000	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 (sub.)	22·2 *t*	900 2000	829
t.	Connecticut ✓.	16,000	450	76¾	26¾	16,500 B. & W.	New York .	1904	1906	819,300	11½ K.S.	3	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 (sub.)	18·8 *t*	900 2206	803
t.	Delaware .	20,000	510	85	27	tur.	Newport News	Bldg.	..	..	11 K.S.	..	10 K.S.	..	11 K.S.	5 K.S.	10 *12-in.*, 14 *5-in.*, 4 *3-pr.*, 2 l., 3 M.	2 (sub.)	21·0	1000 2300	..
c.d.s., *t.* (1 t.)	Florida ✓. .	3235	252	50	12¾	2336 Nor.	Elizabeth-port	1901	1903	190,075	11–5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	12·4 *t*	355	222
Super-posed turrets.	Georgia ✓. .	14,948	435	76¼	23¾ †	19,000 Nic.	Bath, Me. .	1904	1906	737,700	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 (sub.)	19·2 *t*	900 1704	812
b.	Idaho ✓ .	13,000	375	77	25	10,000 B. & W.	Philadelphia	1905	1908	616,360	9–4 K.S.	3–1½	7 K.S.	7 K.S.	10–7½ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 12 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	2 (sub.)	17·0	600 1750	725
t.	Illinois . ✓ .	11,565	368	72¼	26	12,757	Newport News	1898	1901	533,237	16½–4 H.S.	2¾–4	5¼ H.S.	12 H.S.	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 6 *1-pr.*, 4 M., 2 l.	4	17·45 *t*	800 1275	686
b.	Indiana . .	10,288	348	69¼	27¼	9,607 B. & W.	Philadelphia	1893	1895	620,569	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10 H.S.	4 *13-in.*, 8 *8-in.*, 4 *6-in.*, 20 *6-pr.*, 6 *1-pr.*, 2 M., 1 c.	2	15·5 *t*	400 1567	497
,,	Iowa .. .	11,340	360	72¼	26¾	11,933	Philadelphia	1896	1897	618,514	14 H.S.	2¾	5 H.S.	12 H.S.	15 H.S.	8–6 H.S.	4 *12-in.*, 8 *8-in.*, 6 *4-in.*, 20 *6-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 (sub.)	17·1 *t*	625 1795	520
t.	Kansas ✓. .	16,000	450	77	26¾	16,500 B. & W.	Camden, N.J.	1905	1906	855,850	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4	18·1 *t*	900 2200	854

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Super-posed turrets	Kearsarge ✓ Kentucky ✓	11,540	368	72¼	25¾	11,788 12,179	Newport News	1898	1900	462,345 each	16½–4 H.S.	2¾–5	5½ H.S.	..	15 H.S.	9 H.S.	4 *13-in.*, 4 *8-in.*, 14 *5-in.*, 20 *6-pr.*, 8 *1-pr.*, 4 M., 2 L.	4	16·8 16·9 *t*	410 1591	690 686
t.	Louisiana ✓	16,000	450	76¾	26¾	20,500 B. & W.	Newport News.	1904	1906	819,300	11–8 K.S.	3	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 L.	4	18·8 *t*	900 2200	803
„	Maine ✓	12,300	388	72½	25½	15,693 Nic.	Philadelphia	1901	1902	592,828	11–4 K.S.	2¾–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2 sub.	18·0 *t*	1000 1800	551
a.c.	Maryland ✓	13,680	502	69½	24½	28,059 B. & W.	Newport News.	1903	1905	756,400	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·4 *t*	900 1850	829
b.	Massachusetts	10,288	348	69¼	27⅓	10,240	Philadelphia	1893	1896	620,569	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10–5 H.S.	4 *13-in.*, 8 *8-in.*, 4 *6-in.*, 20 *6-pr.*, 8 *1-pr.*, 2 M., 2 l.	3	16·2 *t*	400 1560	509
„	Michigan	16,000	450	80½	24½	16,000 B. & W.	Newport News	Bldg.	..	700,000	12-9	3	8	10	12–8	8	8 *12-in.*, 22 *3-in.*, and smaller.	..	..	..	..
a.c.	Milwaukee ✓	9700	424	66	25½	21,000 W.T.	S. Francisco.	1904	1906	580,500	4 H.N.S.	3	4 H.N.S.	..	4 H.N.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·0	650 1500	664
t.	Minnesota ✓	16,000	450	77	26¾	16,500 B. & W.	Newport News	1905	1906	844,500	8–11 K.S.	3–1½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	18·8 *t*	900 2200	881
b.	Mississippi ✓	13,000	375	77	24¾	10,000 B. & W.	Philadelphia	1905	1908	616,360	9–4 K.S.	3–1½	7 K.S.	7 K.S.	10–7½ K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 8 *7-in.*, 12 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	2 sub.	17·11 *t*	600 1750	725
t.	Missouri ✓	12,300	388	72¼	25½	15,845 T.	Newport News	1901	1903	592,828	12–4 K.S.	2¾–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 4 *1-pr.*, 2 M., 2 l.	2 sub.	18·1 *t*	1000 1836	551
a.c.	Montana ✓	14,500	502	72¾	25	25,000 B & W.	Newport News	1906	1908	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 sub.	22·0	900 2000	845
c.d.s., t.	Monterey	4084	256	59	15½	5244 B. & W.	S. Francisco.	1891	1893	345,731	13–6 H.S.	3	..	..	13 H.S.	..	2 *12-in.*, 2 *10-in.*, 6 *6-pr.*, 4 *1-pr.*, 2 M.	..	13·6 *t*	200 233	218
Super-posed turrets.	Nebraska ✓	14,948	435	76¼	23⅓ †	19,000 B. & W.	Seattle.	1904	1906	767,210	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·0	900 1900	812
c.d.s., t. (1 t.)	Nevada ✓	3714	252	50	12¾	2,400 Nic.	Bath, Me.	1900	1903	197,267	11–5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	13·0 *t*	338	222
t.	NewHampshire ✓	16,000	450	77	26¾	16,500 B. & W.	Camden, N.J.	1906	1908	1,600,000 (Total)	9–4 K.S.	3	7 K.S.	7 K.S.	12 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 12 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4	18·0	900 2350	916
Super-posed turrets.	New Jersey ✓	14,948	435	76¼	23⅓ †	19,000 B. & W.	Quincy, Mass.	1904	1905	699,680	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·4 *t*	900 1900	812
a c.	New York	8200	380½	64⅓	27½	17,075	Philadelphia	1891	1893	613,377	4 H.S.	6–3	..	..	10 H.S.	5–4¼ H.S.	6 *8-in.*, 12 *4-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 2 l.	2	21·0 *t*	750 1334	498

The sums given in this column are exclusive of the cost of armour and armament according to the system of making appropriations in the estimates. † Mean draught.
‡ Including armour but not armament.

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UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	North Carolina ✓	14,500	502	72¾	25	25,000 B. & W.	Newport News	1906	1908	970,630‡	5-3 K.S.	3	5 K.S.	9 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4	22·48	900	845
																		sub.	*t*	2000	
b.	North Dakota .	20,000	510	85	27	..	Quincy, Mass.	Bldg.	..	..	11 K.S.	..	10 K.S.	..	11 K.S.	5 K.S.	10 *12-in.*, 14 *5-in.*, 4 *3-pr.*, 2 *l.*, 3 M.	2	21·0	1000	..
																		sub.		2300	
t.	Ohio ✓ .	12,440	388	72½	25½	16,220 T.	S. Francisco.	1901	1904	595,705	11·4 K.S.	3–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2	17·8	1000	521
																		sub.	*t*	2144	
b.	Oregon . .	10,288	348	69½	27¼	11,033	S. Francisco.	1893	1896	653,447	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10–5 H.S.	4 *13-in.*, 8 *8-in.*, 4 *6-in.*, 20 *6-pr.*, 4 *1-pr.*, 4 M., 1 l.	3	16·8	400	500
																			t	1594	
a.c.	Pennsylvania ✓ .	13,680	502	69½	24½	23,600 Nic.	Philadelphia	1903	1905	799,340	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2	22·4	900	829
																		sub.	*t*	2000	
c.d.s. (2 t.)	Puritan . .	6060	290¼	60	18½	3,700	Chester .	1882 reblt.	1896	..	14-6 H.S.	2	..	..	14 H.S.	..	4 *12-in.*, 6 *4-in.*, 6 *6-pr.*, 2 *1-pr.*, 4 M.	..	12·4 *t*	307	230
Super-posed	Rhode Island ✓ .	14,948	435	76¼	23¾ †	19,000 B. & W.	Quincy, Mass.	1904	1905	699,680	11-4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·0	900 1900	812
a.c.	St. Louis ✓ .	9700	424	66	25½	21,000 B. & W.	Philadelphia (Cramp)	1905	1906	563,030	4 K.S.	3	4–3	..	4 K.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·3 *t.*	650 1500	664
*b.*1stcl.	South Carolina	16,000	450	80¼	24½	16,000 B. & W.	Philadelphia (Cramp)	1908	..	700,000	12-9	3	8	10	12–8	8	8 *12-in.*, 22 *3-in.* and smaller.	..	..	..	..
a.c.	South Dakota ✓ .	13,680	502	69½	24½	23,000 B. & W.	S. Francisco.	1904	1907	770,570	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·0	900 2000	829
,,	Tennessee ✓ .	14,500	502	72¾	25	23,000 B. & W.	Philadelphia	1904	1906	970,630‡	5-3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	4 sub.	22·1 *t.*	900 2000	858
t.	Vermont . ✓ .	16,000	450	77	26¾ †	16,500 B. & W.	Quincy, Mass.	1905	1906	858,730	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	18·33 *t.*	900 2200	854
Super-posed	Virginia . ✓ .	14,948	435	76¼	23¾ †	19,000 Nic.	Newport News	1904	1905	737,700	11-8 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	4 sub.	19·0	900 1900	812
a.c.	Washington ✓ .	14,500	502	72¾	27	25,000 B. & W.	Camden, N.J.	1905	1906	970,630‡	5-3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	4 sub.	22·8 *t.*	900 2000	858
,,	West Virginia ✓	13,680	502	69½	24½	26,135 B. & W.	Newport News	1903	1905	798,310	6–3½ K.S.	4	5 K.S.	12 H.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·1 *t*	900 2000	829
t.	Wisconsin ✓ .	11,653	368	72¼	26	12,452	S. Francisco.	1898	1901	549,666	16½-4 H.S.	3-4	5½ H.S.	..	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 6 *1-pr.*, 4 M., 2 l.	4	17·1 *t*	800 1310	583
c.d.s. (1 t.)	Wyoming ✓ .	3218	252	50	12¾	2,451 B. & W.	S. Francisco.	1900	1903	200,350	11-5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	12·4 *t*	881	222
b.	Two Delawares .	..	..	..	..	..	..	Pro.	..	..	11	..	10	..	11	5	10 *12-in.*, 14 *5-in.*, 4 *3-pr.*, 2 l., 3 M.	2 sub.	21·0	1000 2300	..

* See note on previous page. † Mean draught. ‡ Including armour, but not armament.

Also the monitors Amphitrite, Miantonomoh, Monadnock, and Terror (3990 tons), the second-class battleship Texas (6315 tons), and the ram Katahdin (2155 tons).

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UNITED STATES.--Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl.*cr.*	Albany ✓. shd.	3487	345	43¾	20	7500	Elswick .	1899	1900	247,611	3	3–1½ shields	6 *6-in.*, 10 *3-pr.*, 12 *1-pr.*, 2 M., 1 l.	..	20·5 *t*	512 / 747	356
g.b. .	Annapolis . .	1000	168	36	12½	1227	Elizabeth Port	1896	1897	46,789	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M	..	13·1 *t*	100 / 225	135
cr. .	Atlanta ✓. .	3000	271¼	42¼	20½	4030 C. & B.&W.	Chester .	1884	1886	126,785	1½	..	2 *8-in.*, 6 *6-in.*, 6 *6-pr.*, 4 *1-pr.*, 2 M.	..	15·6 *t*	382 / 573	304
3rd cl.*cr.*	Baltimore . ✓.	4413	327½	48½	24	10,064	Philadelphia Port	1888	1890	272,270	4–2½	4½ shield	12 *6-in.*, 6 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 5 M., 1 l.	..	20·1 *t*	709 / 1064	383
g.v. .	Bancroft . .	839	187½	32	13	1213	Elizabeth	1892	1893	51,371	½	..	4 *4-in.*, 8 *3-pr.*, 1 *1-pr.*, 1 M.	..	14·37 *t*	100 / 136	195
cr. .	Bennington . .	1710	230	36	16½	3392	Chester .	1890	1891	100,894	½	..	6 *6-in.*, 4 *6-pr.*, 4 *1-pr.*, 4 M.	..	17·5 *t*	200 / 403	195
scout .	Birmingham ✓.	3750	420	46¾	17	16,000 Express	Quincy, Mass.	1907	..	301,000	2–1½	..	2 *5-in.*, 6 *3-in.* . . .	2 sub.	24·0	1250	356
cr. .	Boston . . ✓.	3000	271¼	42¼	20½	4030	Chester .	1884	1887	127,196	1½	..	2 *8-in.*, 6 *6-in.*, 6 *6-pr.*, 4 *1-pr.*, 2 M., 1 l.	..	15·6 *t*	380 / 456	282
g.v. .	Castine . . ✓	1177	204	32	14¼	2199	Bath, Me. .	1892	1894	65,450	½	..	8 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	16·0	125 / 292	151
cr. .	Chattanooga shd..	3200	292	44	16¾	5303 B.&W.	Elizabeth Port	1903	1904	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·65 *t*	470 / 700	302
scout .	Chester . ✓.	3750	420	46¾	17	16,000 Nor. turb.	Bath, Me. .	1907	..	337,000	2–1½	..	2 *5-in.*, 6 *3-in.* . . .	2 sub.	24·0†	1250	356
3rd cl.*cr.*	Chicago ✓ .	5273	325	48¼	22½	9000 C. & B.&W.	Chester .	1885	1889	182,677	1½	4 shield	4 *8-in.*, 14 *5-in.*, 9 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	18·0	831	409
,, ,,	Cincinnati . .	3213	300	42	20¼	8,490 B.&W.	Brooklyn .	1892	1894	226,055	2½	4	11 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 2 M.	..	19·0	350 / 468	314
cr. .	Cleveland . shd..	3200	292	44	16¾	4640 B.&W.	Bath, Me. .	1901	1903	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·4 *t*	470 / 700	302
2nd cl.*cr*	Columbia . .	7375	412	58¼	25½	18,509	Philadelphia	1892	1894	559,950	4–2½	4 shield	1 *8-in.*, 2 *6-in.*, 8 *4-in.*, 12 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	22·8 *t*	750 / 1670	477
g.v. .	Concord . .	1710	230	36	16½	3404	Chester .	1890	1891	100,894	½	..	6 *6-in.*, 2 *6-pr.*, 2 *3-pr.*, 2 *1-pr.*	..	16·8 *t*	200 / 401	194

* Prices exclusive of armament.

† 26·52 knots on trials.

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UNITED STATES.—Cruising Ships, &c.—*continued.*

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. †	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.v.	Denver ✓	3200	292	44	16¾	4135 B. & W.	Philadelphia Quincy, Mass.	1902	1904	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·75	470/700	303
,,	Des Moines ✓ shd.																
3rd cl.*cr.*	Detroit	2089	257	37	16¾	5207	..	1891	1892	..	..	..	10 *5-in.*, 6 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	18	200/340	248
g.v.	Dolphin ✓	1486	240	32	17	2255	Chester	1884	1885	64,728	..	..	2 *4-in.*, 1 *6-pr.*, 6 *3-pr.*, 2 M.	..	15·5 *t*	173	117
,,	Don Juan de Austria	1159	210	32	13	1500	Cartagena	1889	1892	..	..	..	6 *4-in.*, 4 *6-pr.*, 4 M.	..	14·0	210	130
,,	Dubuque	1085	174	35	13	1193 B. & W.	Morris Heights N.Y.	1904	1905	..	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.* 2 M.	..	12·9	200	162
cr.	Galveston ✓ shd.	3200	292	44	16¾	5073 B. & W.	Richmond, Va.	1903	1904	212,325	2	..	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·4	470/700	302
g.v.	Helena	1392	250¾	40	10	1988	Newport News	1896	1897	57,536	½	2½	8 *4-in.*, 4 *6-pr.*, 4 *1-pr.*, 2 M	..	15·5 *t*	100/300	256
,,	Isla de Cuba	1125	192	30	12¼	2627	Elswick	1887	1888	..	2½	..	6 *3-in.*, 4 *6-pr.*, 4 M.	..	16·0	160	160
,,	Isla de Luzon												4 *4-in.*, 4 *6-pr.*, 4 M.				
,,	Machias	1177	204	32	14½	2046 Nor.	Bath, Me.	1891	1893	65,450	½	..	8 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 2 M.	..	15·46 *t*	125/292	151
3rd cl.*cr.*	Marblehead	2089	257	37	16¾	5450	Boston	1892	1894	138,498	½	..	10 *5-in.*, 6 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	18·9 *t*	200/340	248
g.b.	Marietta	1000	174	34	13½	1054 B.&W.	S. Francisco.	1896	1897	45,823	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	13·2 *t*	100/239	140
2nd cl.*cr.*	Minneapolis	7375	412	58½	25½	20,862	Philadelphia	1893	1894	552,754	4–2½	4 shield	1 *8-in.*, 2 *6-in.*, 8 *4-in.*, 12 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	23·0 *t*	750/1200	477
3rd cl.*cr.*	Montgomery *	2089	257	37	17	5584	Baltimore	1891	1894	125,860	½	..	4 *6-pr.*	6 (2 sub.)	18·8 *t*	200/340	257
g.v.	Nashville	1371	220	38	12	2536 C. & Y.	Newport News	1895	1897	57,536	½	..	8 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 2 M.	..	16·7 *t*	150/400	176
3rd cl.*cr.*	Newark	4098	311½	49½	22½	8868	Philadelphia	1890	1891	256,437	3-2	2 shield	12 *6-in.*, 6 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	..	19·0	400/809	384

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g.b.	**Newport** . .	1000	168	36	13	1009	Bath, Me. .	1896	1897	..	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·2 *t*	100 / 230	147
3rd cl. *cr.*	**New Orleans** shd.	3487	346	43¾	19¾	7500	Elswick .	1896	1898	293,684	..	3–1¼ shields	6 *6-in.*, 4 *4·7 in.*, 10 *3-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	20·0	512 / 767	366
2nd cl. *cr.*	**Olympia** . .	5870	340	53	24¾	17,313	S. Francisco.	1892	1895	369,054	4½	4–2½	4 *8-in.*, 10 *5-in.*, 14 *6-pr.*, 4 *1-pr.*, 2 M.	..	21·69 *t*	400 / 1169	450
g.v.	**Paducah** . .	1085	174	35	13	1000 B.&W.	Morris Heights, N.Y.	1904	1905	..	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 2 M.	..	12·0	200	162
„	**Petrel** . . .	892	176¼	31	13½	1045	Baltimore .	1888	1889	50,755	..	..	4 *6-in.*, 2 *3-pr.*, 4 M. . .	..	11·8 *t*	100 / 200	122
g.b.	**Princeton** . .	1000	168	36	12½	923	Camden .	1897	1898	47,262	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M. .	..	12·0	100 / 238	135
3rd cl. *cr*	**Raleigh** . .	3213	300	42	20¼	8500 B.&W.	Norfolk .	1892	1894	226,055	2½	4	11 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	..	19·0	350 / 460	313
scout	**Salem** . . .	3750	420	46¾	18¼	16,000 W.T. turb.	Quincy, Mass.	1907	..	301,000	2–1½	..	2 *5-in.*, 6 *3-in.* . . .	2 sub.	24·0	1250	356
3rd cl. *cr.*	**San Francisco** .	4098	310	49¼	22¼	10,604	S. Francisco	1889	1891	293,435	3–2	2 Shields	12 *6-in.*, 10 *6-pr.*, 4 *1-pr.*, 2 M.	..	19·5	350 / 628	383
„	**Tacoma** . shd.	3200	292	44	16¾	5288 B.&W.	S. Francisco.	1903	1904	212,325	..	2 Shields	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·6 *t*	470 / 700	302
g.v.	**Vicksburg** . .	1000	168	36	12½	1118	Bath, Me. .	1896	1898	47,406	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·7 *t*	100 / 239	135
„	**Wheeling** . .	1000	174	34	12½	1080	S. Francisco.	1897	1897	65,540	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·9 *t*	120 / 226	140
„	**Wilmington** .	1392	250¾	40	10	1894	Newport News	1895	1897	57,536	1	2¼	8 *4-in.*, 4 *6-pr.*, 4 *1-pr.*, 4 M.	..	15·0 *t*	100 / 300	175
cr.	**Yorktown** . .	1710	230	36	16½	3392	Philadelphia	1888	1889	93,496	..	..	6 *6-in.*, 2 *6-pr.*, 2 *3-pr.*, 4 *1-pr.*, 2 M.	2	16·1 *t*	200 / 380	195

* Torpedo training ship. † Prices exclusive of armament.

Also the sailing training ships Chesapeake (1175 tons), launched 1899, Cumberland, Intrepid and Boxer, launched 1904.

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Enrolled Auxiliary Cruisers of the United States Navy.

Class.	NAME.	Gross Tonnage.	Length.	Beam.	Depth.	Indicated Horse-Power.	Where Built.	When Built.	Owners.	Armament.	Speed.
			ft.	ft.	ft.						
1*st*	St. Louis	11,629	535½	63	26¾	18,000	Philadelphia .	1895	International Navigation Co.	The armament comprises *6-in.*, *5-in.*, and *4-in.* guns.	22·2
,,	St. Paul	11,629	535½	63	26¾	18,000	,,	1895	,,		22·5
,,	Paris.	10,794	517	63¼	22	20,000	Clydebank, Scotland	1880	,,		20·7
,,	New York . . .	10,802	517	63¼	22	20,000	,,	1888	,,		20·6
,,	Philadelphia . . .	10,802	517	63¼	22	20,000	..	18·9	,,		20·8
,,	Corea	11,200	..	..	..	..	..	1901	Pacific Mail Steamship Co.		18·0
,,	Siberia	11,200	..	..	..	..	..	1901	,,		18·0

Converted Merchant Vessels Retained.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armament.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.				£		knots.	tons.	
cr.	Buffalo	6888	380½	48	22	3600	Newport News .	1893	117,949	12 *5-in.*, 6 *6-pr.*, 4 *4-in.*, 2 M.	14·5	100	297
,,	Dixie	6145	389½	48	19¾	3800	Newport News .	1893	117,949	8 *5-in.*, 4 *6-pr.*, 4 *1-pr.*, 2 M.	16·0	1371	181
,,	Prairie	6872	390½	46¾	22	3800	Philadelphia .	1890	117,949	8 *6-in.*, 6 *6-pr.*, 4 *3-pr.*, 4 *1-pr.*, 2 M.	14·5	1000	295
,,	Yankee	6888	380½	48	22	3800	Newport News .	1892	117,949	8 *5-in.*, 6 *6-pr.*, 2 *1-pr.*, 2 M.	14·5	1000	282
,,	Mayflower (yacht) .	2690	275	36	17½	4600	Clydebank .	1896	88,359	. . . .	16·8	584	160

The armament of the above vessels includes 4-in., 5-in., and 6-in. guns.

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SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LESSER IMPORTANCE.

Belgium.—Several steam vessels, between 419 and 684 tons, principally employed as packets, under the orders of the Government. The Ville d'Anvers, 414 tons, for fishery protection.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's yacht. Two armoured gunboats for the Danube completing at Leghorn. The Nadiezda, a despatch vessel (715 tons), launched at Bordeaux in 1898; speed, 18·85 knots; 2600 I.H.P.; Lagrafel-d'Allest boilers; armament, 2 3·9-in., 3 1·8-in. Q.F., and 2 torpedo tubes. Three 100 ton 26 knot torpedo boats launched 1907; three smaller.

Colombia.—The cruiser Almirante Lezo (*ex* El Baschir), of 1200 tons displacement; 2500 H.P.; speed, 18 knots; built in 1892 bought from Morocco, 1902. Two gunboats, Chercuito, 643 tons, and Bogota. Two river gunboats, General Nerino and Esperanza, 400 tons.

Ecuador.—Two old (1886) French despatch vessels, Papin and Inconstant (891 tons), built of wood and iron, were bought One torpedo boat and two steam transport vessels.

Egypt.—The Nile stern-wheel gunboats Sultan, Sheikh and Melik, 140 tons, Fateh and Naseh, 128 tons; also the Abu Klea, Hafir, Metemmeh, and Tamai. Some steam vessels on the coast.

Hayti.—Steel gunboat—Capois la Mort, 260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines, 1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 l., 2 M. Two sloops—St. Michael and 1804. Gun vessel, 22nd of December.

Mexico.—Two gun-vessels, Tampico and Vera Cruz, launched at Elizabethport, New Jersey, September, 1902, displacement, 980 tons; armament, 4 4-in. Q.F., 6 6-pr.; bow torpedo tube; 2400 I.H.P.; speed, 16 knots; fitted to serve as transport for 200 troops. Gun. vessels Bravo and Morero, 1200 tons; 2600 I.H.P.; Blechynden boilers; 17 knots; launched at the Orlando Yard, Leghorn, 1904 The Zaragoza, built of steel, 1200 tons, 1300 H.P., 15 knots speed, and armed with 4 4·7-in. guns and 4 small quick-firing guns. Two gun vessels—Democrata and Mexico, of 450 tons and 11 knots speed, armed with 2 6½-in. muzzle-loaders and 2 small guns. Two small gunboats of 10 knots speed. Five torpedo boats.

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Peru.—Almirante Grau, cruiser, 3200 tons; 370 ft. long, 40 ft. 6 in. beam, 14 ft. 3 in. draught; launched at Barrow, March, 1906; 2 6-in., 8 14-pr., 8 1¼-pr.; 2 submerged torpedo-tubes; 1½-in. armoured deck, 3-in. conning tower; 14,000 I.H.P.; 24 knots. A sister vessel is in hand at the same yard. Eclaireur, cruiser, 1769 tons, launched 1877, and partially reconstructed. Bought from France. Lima, built 1881, of 1700 tons displacement, 1800 I.H.P., 16 knots speed; armament, 2 6-in. B.L.R. guns. Screw steamer, Santa Rosa, of about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in.), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam; 1320 tons; 3000 I.H.P.; armament, 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 360 tons; Grivitza, 110 tons. Two gunboats of 45 tons, and 3 first-class torpedo boats, these forming the sea division. For the Danube, the gunboats Fulgurul, Oltul, Siretul, Bistritza, 90 to 100 tons, the *torpilleur de barrage* Alexandru cel Bun (104 tons), 5 sloops, 2 small torpedo boats, and the paddle steamer Romania, 240 tons, repaired 1890. The shipbuilding programme includes 8 monitors of 600 tons, 12 torpedo-boats and 8 vedettes for the Danube, and 6 coast-defence vessels of 3500 tons, 4 destroyers of 300 tons, and 12 torpedo-boats for the Black Sea. Four of the monitors (3 4·7-in. guns) and 3 torpedo-boats have been completed.

Santo Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gunvessel, 1000 tons, launched at Glasgow in 1896. The 14-knot cruiser Presidente has been reconstructed, and carries seven guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Deck-protected cruiser, Maha Chakrkri, 290 ft. long, 39 ft. 4 in. beam, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in. quick-firing guns, and ten 6-pr. quick-firing guns. Makut-Rajakamar, 650 tons. The gunboats Bali, Muratha, and Sugrib, 600 tons, one 4·7-in. Q.F., five 2·2 in., four 1·4 in., 12 knots, launched 1898 and 1901. Several other gunboats. Three modern despatch vessels 100 to 250 tons.

Uruguay.—Gunboats: General Artigas, 274 tons, 12½ knots speed, 2 4·7-in. (Krupp), 2 M.; and General Saurez, 300 tons. The Italian cruiser Dogali has been purchased.

Venezuela.—The gunboats Bolivar (571 tons, 18·6 knots) and Miranda (200 tons, 12 knots); transports Restaurador (568 tons) and Zamora (350 tons).

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BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

Great Britain.

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain. TORPEDO-BOAT DESTROYERS.			Feet	Feet.	Feet.		Tons.		Knots.				Tons.
†Ardent	Thornycroft	1894	201·6	19	7·3	2	265	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
Banshee	Laird	1894	210	19·5	..	2	290	4,400	27·97	1-12 pr. 3-6 prs.	2	50	
†Boxer	Thornycroft	1894	201·6	19	7·3	2	265	4,500	27·17	1-12 pr. 5-6 prs.	2	45	60
†Bruizer	,,	1895	201·6	19	7·3	2	265	4,500	27·97	1-12 pr. 5-6 prs.	1	45	60
*Charger	Yarrow	1894	190	18·5	5·25	2	270	3,100	27·98	1-12 pr. 5-6 prs.	2	45	60
Conflict	White	1894	205·6	20	..	2	320	4,370	27·21	1-12 pr. 5-6 prs.	2	50	60
Contest	Laird	1894	210	19·5	..	2	290	4,400	27·4	1-12 pr. 3-6 prs.	1	50	60
†Daring	Thornycroft	1893	185	19	7	2	260	4,300	27·70	1-12 pr. 3-6 prs.	1	45	50
*Dasher	Yarrow	1894	190	18·5	5·25	2	255	3,182	26·21	1-12 pr. 5-6 prs.	2	45	60
Dragon	Laird	1894	210	19·5	..	2	290	4,500	27·14	1-12 pr. 3-6 prs.	1	50	
Ferret	,,	1893	194	19·25	5	2	280	4,810	27·62	1-12 pr. 3-6 prs.	1	50	70
Fervent	Hanna	1895	205	19	7·8	2	275	3,800	[27]	1-12 pr. 5-6 prs.	1	50	70
†Handy	Fairfield	1895	200	19	7·8	2	275	3,800	27·04	1-12 pr. 5-6 prs.	1	50	70
Hardy	Doxford	1895	196	19	5	2	260	4,200	26·8	1-12 pr. 5-6 prs.	2	50	70
†Hart	Fairfield	1895	185	19	7	2	275	4 010	27·07	1-12 pr. 5-6 prs.	1	50	70
*Hasty	Yarrow	1894	190	18·5	5·25	2	270	3,250	26·08	1-12 pr. 5-6 prs.	2	45	60
Haughty	Doxford	1895	196	19	5	2	260	4,000	27·1	1-12 pr. 5-6 prs.	2	50	60
Havock	Yarrow	1893	180	18·5	5·25	2	240	3,500	26·77	1-12 pr. 3-6 prs.	1	43	57
Hornet	,,	1893	180	18·5	5·25	2	240	4,000	27·31	1-12 pr. 3-6 prs.	1	43	57
†Hunter	Fairfield	1895	200	19·7	6·5	2	275	4,000	27·2	1-12 pr. 5-6 prs.	1	45	60
Janus	Palmer	1895	200	19·7	6·5	2	275	3,789	27·8	1-12 pr. 5-6 prs.	2	50	60
Lightning	,,	895	200	19·7	6·5	2	275	4,007	27·94	1-12 pr. 5-6 prs.	2	50	60
Lynx	Laird	1894	194	19·25	5	2	280	4,000	27·00	1-12 pr. 3-6 prs.	1	50	70
Opossum	Palmer	1895	200	19	5·2	2	295	4,052	28·24	1-12 pr. 5-6 prs.	1	50	60
Porcupine	,,	1895	200	19·7	6·5	2	275	3,866	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	,,	1895	200	19	5·2	2	295	3,900	27·13	1-12 pr. 5-6 prs.	1	50	60
Rocket	Brown & Co.	1894	205·6	19·5	5·25	2	280	4,200	27·37	1-12 pr 5-6 prs.	2	50	60
Salmon	Earle's Co.	1895	200	19·5	5·4	2	305	3,580	27·60	1-12 pr 5-6 prs.	2	50	60
Shark	Thomson	1894	205·6	19·5	5·25	2	280	4,250	27·59	1-12 pr 5 6 prs.	2	50	60
Snapper	Earle's Co.	1895	200	19·5	5·5	2	305	4,500	27·9	1-12 pr. 5-6 prs.	2	50	60
Spitfire	Armstrong	1895	200	19	5·3	2	295	3,780	27·5	1-12 pr. 5-6 prs.	1	45	60
Starfish	Vickers	1895	195	20·5	..	2	265	4,000	27·97	1-12 pr. 5-6 prs.	2	45	60
Sturgeon	,,	1894	195	20·5	..	2	265	4,010	27 16	1-12 pr. 5-6 prs.	2	45	60
Sunfish	Palmer	1895	200	19	5·2	2	295	4,292	27·62	1-12 pr. 5-6 prs.	1	50	60
Surly	Thomson	1894	205·6	19·5	5·25	2	280	4,400	28·05	1-12 pr. 5-6 prs.	2	50	60
Swordfish	Armstrong	1895	200	19	5·3	2	295	4,100	[27]	1-12 pr. 5-6 prs.	1	45	60
Teazer	White	1895	201	19·5	5·6	2	320	4,500	[27]	1-12 pr. 5-6 prs.	2	50	60
Wizard	,,	1895	200	19·5	5·2	2	320	4,400	[27]	1-12 pr. 5-6 prs.	2	45	60
Zebra	Thames Ironworks	1895	200	20	6	2	310	3,850	27·00	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Hanna	1895	200	9	5·3	2	275	3,850	[27]	1-12 pr. 5-6 prs.	1	50	60
†Albatross	Thornycroft	1898	227·6	21·25	8·5	2	430	7,900	32	1-12 pr. 5-6 prs.	2	68	100
†Angler	,,	1897	210	19·6	7·1	2	310	5,800	30·37	1-12 pr. 5-6 prs.	2	60	80
Arab	Brown & Co.	1901	218	20·0	5·6	2	470	6,000	31	1-12 pr. 5-6 prs.	2	60	80
†Ariel	Thornycroft	1897	210	19·6	7·1	2	310	5,800	30·59	1-12 pr. 5-6 prs.	2	60	80
†Avon	Vickers	1896	210·6	21·6	5·6	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Bat	Palmer	1896	215	20·75	6·8	2	360	6,185	30·1	1-12 pr. 5-6 prs.	2	60	91
†Bittern	Vickers	1897	210·6	21·6	5·6	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Brazen	Brown & Co.	1896	218	20·0	5·6	2	345	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Bullfinch	Earle's Co.	1898	210	20·6	5·8	2	345	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Cheerful	Hawthorn	1897	210	21·0	8	2	355	6,000	30	1-12 pr. 5-6 prs.	2	62	82
†Coquette	Thornycroft	1897	210	19·5	7·2	2	345	5,800	30·31	1-12 pr. 5-6 prs.	2	60	80
Crane	Palmer	1896	215	20·7	6·8	2	360	6,036	30·3	1-12 pr. 5-6 prs.	2	60	80
†Cygnet	Thornycroft	1898	210	19·5	7·2	2	335	5,800	30·35	1-12 pr. 5-6 prs.	2	60	80
†Cynthia	,,	1898	210	19·5	7·2	2	355	5,800	30·2	1-12 pr. 5-6 prs.	2	60	80
†Desperate	,,	1896	210	19·6	7·2	2	310	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Dove	Earle's Co.	1898	210·0	20·6	5·8	2	345	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Earnest	Laird	1896	210·6	21·7	5·3	2	355	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Electra	Brown & Co.	1896	218	20·0	5·6	2	3 0	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Express	Laird	1897	227 6	22·0	9	2	465	9,000	31	1-12 pr. 5-6 prs.	2	60	80
Fairy	Fairfield	1897	227·6	22·0	9	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Falcon	,,	1899	220	21·3	9	2	375	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Fame	Thornycroft	1896	210·6	19·6	7·1	2	310	5,800	30·16	1-12 pr. 5 6 prs.	2	60	80
Fawn	Palmer	1897	215	20·7	6·8	2	360	6,581	30·5	1-12 pr. 5-6 prs.	2	60	91
Flirt	,,	1897	215	20·7	6·8	2	360	6,682	30	1-12 pr. 5-6 prs.	2	60	91
Flying Fish	,,	1897	215	20·7	6·8	2	360	6,416	30·4	1-12 pr. 5-6 prs.	2	58	91

* Built by Yarrow, fitted with Thornycroft W.T. boilers at Earle's. All Jarrow-built destroyers have Reed's boilers. Vessels marked † have Thornycroft W.T. boilers. The Skate has been used as a target.

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Great Britain—*continued.*

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	* Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO-BOAT DESTROYERS.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
†Foam	Thornycroft	1896	210	19·6	7·1	2	310	5,800	30·18	1-12 pr. 5-6 prs.	2	58	80
Gipey	Fairfield	1897	227·6	22·0	9	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Greyhound	Hawthorn	1900	210	21	8·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Griffon	Laird	1896	210·0	20	5·3	2	355	6,000	30·11	1-12 pr. 5-6 prs.	2	58	80
Kestrel	Brown & Co.	1898	218	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Kangaroo	Palmer	1900	215	20·75	6·8	2	370	6,500	30	1-12 pr. 5-6 prs.	2	..	91
†Lee	Doxford	1899	210 0	19·9	7·6	2	365	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Leopard	Vickers	1897	210	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Leven	Fairfield	1898	218 0	20.0	5·6	2	370	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Lively	Laird	1900	218	20·0	5·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Locust	,,	1896	210	21·7	5·3	2	355	6,000	30·16	1-12 pr. 5-6 prs.	2	58	80
†Mallard	Thornycroft	1896	210·6	19·6	7·1	2	310	5,800	30·11	1-12 pr. 5-6 prs.	2	60	80
Mermaid	Hawthorn	1898	210	21 0	8	2	355	6,000	30	1-12 pr. 5-6 prs.	2	62	82
Myrmidon	Palmer	1900	215	20·75	6·8	2	370	6,500	30	1-12 pr. 5-6 prs.	2	..	91
Orwell	Laird	1898	218·0	20·0	5·6	2	360	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Osprey	Fairfield	1897	227·6	22·0	9	2	355	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Ostrich	,,	1900	210	21·0	9	2	375	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Otter	Vickers	1896	210	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Panther	Laird	1897	210·6	21·7	5·3	2	355	6,000	30·14	1-12 pr. 5-6 prs.	2	58	80
Peterel	Palmer	1899	215	20·8	..	2	370	6,200	30	1 12 pr. 5-6 prs.	2	62	85
Quail	Laird	1895	213·6	21·6	5·3	2	355	6,000	30·38	1-12 pr. 5-6 prs.	2	58	90
Racehorse	Hawthorn	1900	210	21	8·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Recruit	Brown & Co.	1896	218·0	20·0	5·6	2	350	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Roebuck	Hawthorn	1901	210	21	8·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Seal	Laird	1897	218·0	20·0	5·6	2	355	6,000	30·15	1-12 pr. 5-6 prs.	2	58	80
Spiteful	Palmer	1899	215	20·75	6·8	2	365	6,500	30·1	1-12 pr. 5-6 prs.	2	..	91
Sprightly	Laird	1900	218	20·0	5·6	2	385	6,000	30	1-12 pr. 5-6 prs.	2	58	80
†Stag	Thornycroft	1900	210	19·75	7·2	2	320	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Star	Palmer	1896	215	20·75	6·88	2	360	6,266	30·7	1-12 pr. 5-6 prs.	2	58	91
Success	Doxford	1901	210·0	21·0	9·2½	2	380	6,000	30	1-12 pr. 5-6 prs.	2	62	43
†Sylvia	,,	1897	210	19·9	7·6	2	350	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Syren	Palmer	1900	215	20·75	6·8	2	390	6,500	30	1-12 pr. 5-6 prs.	2	..	91
Taku	Schichau	1898	193·6	20	5	2	305	6,500	32	6-3 pr. Q.	3	..	67
Thorn	Brown & Co.	1900	210	21	5·5	2	380	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Thrasher	Laird	1895	210·6	21·7	5·3	2	355	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
**Tiger	Brown & Co.	1900	210	21	5·5	2	380	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Vigilant	,,	1900	210	21	5·5	2	380	6,000	30	1-12 pr. 5-6 prs.	2	58	80
†Violet	Doxford	1897	210	20·75	6·88	2	350	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Virago	Laird	1895	210·6	21·7	5·3	2	355	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
aVixen	Vickers	1900	210·0	20·0	5·8	2	400	6,000	30	1-12 pr. 5-6 prs.	2	62	88
Vulture	Brown & Co.	1898	218	20	5·6	2	345	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Whiting	Palmer	1896	215	20·75	6·88	2	360	6,239	30·2	1-12 pr. 5 6 prs.	2	58	91
Wolf	Laird	1897	218	20	5·6	2	355	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Derwent	Hawthorn	1904	220	23	10	2	534	7,000	25	1-12 pr. 5-6 prs.	2	70	130
‡Eden	,,	1903	220	23	8½	6	527	7,000	25	1-12 pr. 5-6 prs.	2	70	130
Exe	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5 6 prs.	2	70	127
Ribble	Yarrow	1904	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Itchen	Laird	1903	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	130
Usk	Yarrow	,,	225	23½	10	2	550	7,500	26	1-12 pr. 5 6 prs.	2	70	120
Teviot	Yarrow	,,	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Ettrick	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	127
Foyle	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	120
Erne	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5 6 prs.	2	70	127
Arun	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	130
Blackwater	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	130
Cherwell	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	127
Dee	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	127
Jed	Thornycroft	1904	222	23½	9·6	2	640	7,500	25½	1-12 pr. 5-6 prs.	2	70	126
Kennet	,,	1903	222	23½	9·6	2	640	7,500	25½	1-12 pr. 5-6 prs.	2	70	126
‡Velox	Parsons	1902	210	23	8½	8	440	8,000	27	1-12 pr. 5 6 prs.	2	63	130
Waveney	Hawthorn	1903	220	23½	10	2	534	7,000	25	1-12 pr. 5-6 prs.	2	70	130
Welland	Yarrow	1904	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Chelmer	Thornycroft	1904											
Boyne	Hawthorn	1904											
Colne	Thornycroft	1905											
Doon	Hawthorn	1904											
Gala	Yarrow	1905											
Garry	Yarrow	1905											
Kale	Hawthorn	1904											
Rother	Palmer	1904											
Liffey	Laird	1904	222	23½	9·6	2	600	7,500	25·5	1-12 pr. 5-6 prs.	2	72	95/126
Moy	,,	1904											
Ness	White	1905											
Nith	,,	1905											
Ouse	Laird	1905											
Swale	Palmer	1905											
Ure	Palmer	1904											
Wear	Palmer	1905											

* The River class of t.b.d. have had 3 12-pr. 8 cwt. guns substituted for the 5 6-prs. they now carry.

† Have Thornycroft W.T. boilers. ‡ Hulls and Yarrow boilers of these vessels by Hawthorn Leslie & Co.

** Tiger lost in collision with the Berwick during night operations, April 2, 1908. a Has four Express W.T. boilers.

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Great Britain—*continued.*

Name or Number.	Built by.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal or Oil.
OCEAN-GOING DESTROYERS.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
‡*Afridi	Armstrong	1907	250	25	7·6	3	795	14,550					92½e
*Cossack	Laird	1907	270	26	8·7	3	890	14,000					78
*Ghurka	Hawthorn	1907	255	25·7	8·8	3	880	14,250	33	3–12-prs.	2	60	98
*Mohawk	White	1907	270	25	8·9	3	870	14,500					74
†*Tartar	Thornycroft	1907	270	26	8·7	3	860	14,500	33	..	..	68	76
*Saracen	White	..	272	26	8·8	..	893	15,500	33	2 4-in.	..	..	84e
*Amazon	Thornycroft	..	280	26½	8·2	..	888						86e
*Crusader	White												
*Maori	Denny												
*Nubian	Thornycroft	..	278	27	8·9	3	990	15,500	33	..	..	..	..
*Viking	Palmer												
*Zulu	Hawthorn												
16 t.b.ds. (programme 1908–9)	..	..	..	..	..	..	..	..	..	..	..	..	..

TORPEDO BOATS. FIRST CLASS—													
a34–38 (5 boats)	White	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	..
39, 40 (2 boats)	Yarrow	1885	100	12·5	..	..	40	500	..	..	1	15	..
41–60 (20 boats)	Thornycroft	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	..
61, 63–74, 76–78 (16 boats)	Yarrow	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
79	,,	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	,,	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81	White	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82–87 (6 boats)	Yarrow	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	,,	1894	142	14·75	4·5	1	112	1,600	..	3–3 prs.	3	18	20
90	,,	1895	140	14·25	3·7	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Thornycroft	1894	140	15·5	7·5	1	130	2,400	23–24	3–3 prs.	3	18	25
93	,,	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	White	1894	140	15·5	..	1	130	2,000	23·2	3–3 prs.	3	18	25
97	Laird	1893	140	15·5	..	1	130	2,690	23·35	3–3 prs.	3	18	25
†98 and 99	Thornycroft	1901	160	17	8·4	1	178	2,850	25	3–3 prs.	3	32	20
†107 and 108													
109–113	,,	1902	166	17·25	8·4	1	200	2,900	25	3–3 prs.	3	32	42
114–117	White	1903	165	17·6	8·8	1	205	2,900	25	3–3 prs.	3	32	23
*Pro. 1905–6 (5 boats (1–5)	¶White	1906	175	17½	5·8	3	235	3,750	26	2–12 prs.	3	35	21
*Pro. 1905–6 (5 boats (6–10)	¶Thornycroft	1906–7	165½	17½	5·8	3	215	3,750	26	2–12 prs.	3	35	20
*Pro. 1906–7 (2 boats (11–12)	¶Yarrow	1907	172	18	5·3	3	225	3,750	26	2–12 prs.	3	35	20
*Pro. 1906–7 (4 boats (13–16)	White	..	182	18	5·10	3	256	4,000	26	2–12 prs.	3	..	..
*Pro. 1906–7 (2 boats (17–18)	Denny	1907	180	18	5·6	3	251	4,000	26	2–12 prs.	3	..	..
*Pro. 1906–7 (3 boats (19–20)	Thornycroft	1907–8	178·6	18·3	5.11	3	280	4,000	26	2–12 prs.	3	..	..
*Pro. 1906–7 (2 boats (21–22)	Hawthorn	1907–8	185	18·6	5·4	3	267	4,000	26	2–12 prs.	3	..	..
*Pro. 1906–7 No. 23	Yarrow	1907	177 3	18	5 4	3	253	4,000	26	2–12 prs.	3	..	..
*Pro. 1906–7 No. 24	Palmer	1908	177	17 9	5·11	3	263	4,000	26	2–12 prs.	3	..	..
*Pro. 1907–8 (4 boats (25–28)	White	..	182	18	6 0	3	262	4,000	26	2–12 prs.	3	..	..
*Pro. 1907–8 (2 boats (29–30)	Denny	..	180	18	5·3	3	259	4,000	26	2–12 prs.	3	..	..
*Pro. 1907–8 (2 boats (31–32)	Thornycroft	..	178 6	18·6	5 11	3	278	4,000	26	2–12 prs.	3	..	..
*Pro. 1907–8 (2 boats (33–34)	Hawthorn	..	185	18 6	5·5	3	265	4,000	26	2–16 prs.	3	..	..
*Pro. 1907–8 (3 boats (35–37)	Palmer	..	177	17·9	5·11	3	261	4,000	26	2–12 prs.	3	..	..

* Fitted with turbines and for using oil fuel. † Have Thornycroft W.T. boilers. ‡ Fitted with modified Yarrow W.T. boilers.
a All the older types of T.B.s from No. 34 to 98 remaining on the list now have a cipher before the figures as No. 034–No. 098.
§ Oil. ‖ Gasoline. ¶ These boats were originally named, as shown in the *Naval Annual* for 1906–1907. e Estimated.
Torpedo Boats 047 and 099 are to be repaired at a cost of £12,917 and £7,813 respectively.

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Great Britain—*continued.*

Number.	Built by.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal or Oil.
			Length.	Beam.	Draught.								
SUBMARINES.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (Nos. 1-5) .	Vickers	1901–2	63·4	11·9	..	1	120	150	7½	..	1	7	..
3 boats (Nos. A 2–A 4, programme 1902-3)	,, ...	1903	100	10	..	1	180	150	{ 15 / 10 }	..	2	..	11
9 new boats (Nos. A 5–A 13 (programme 1903–4)	,, ...	1904	150	..	..	..	204	..	16	..	..	..	..
11 new boats (B Class)	,, ...	1905	135	13½	..	..	313	600	13 9	..	..	..	15
11 new boats (programme 1905–6) C class	,, ...	1906–7	135	13½	..	..	313	600	13	..	..	..	15
6 boats. (programme 1906-7) C 12–16 D 1	Contract	Bldg.	135	13½	..	..	313	600	13	..	..	..	15
2 boats, (programme 1906-7) C 17 & C 18	Chatham												
2 (programme 1907–8) C 19–C 20	Chatham												
10 (programme 1907–8) C 21–C 30	Contract												
2 (programme 1908-9)	Chatham	Pro.	..	..	..	..	..	..	..	..	..	..	..
4 (programme 1906–9)	Contract												

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Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Corrientes	Yarrow ..	1896	190	19 6	7·4	2	280	4,000	27·4 *t.*	1 14-pr.	3	54	80
Misiones..	Yarrow ..	1896	190	19·6	7·4	2	280	4,000	26·0 *t.*	3 6-pr,	3	54	80
Entre Rios	Yarrow ..	1896	190	19·6	7·4	2	280	4,000	26·7 *t.*	Q.F., 2 M.	3	54	80
FIRST CLASS—													
2 boats	Thornycroft	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Yarrow ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15

The two 150-ft. boats are named Comodoro Py and Murature.
The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYER—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Huszar	Yarrow ..	1905											
Streiter		1906											
Ulan		1906											
Wildfang	Trieste ..	1906	219·8	20·3	..	2	384	6,000	28·5	1 12-pr.		64	
Uskoke		1907								7 3-pr.			
Scharfschütze		1907											
6 others	Fiume ...	Bldg.											
FIRST CLASS—													
Adler, Falke	Yarrow ..	1886	135	13·7	5·6	1	95	900	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1890–92	128	15·9	6·9	1	83	900 to 1,000	17·5 to 21·5	2 mach.	2	15	28
Kaiman	Yarrow ..	1905											
Alligator													
Anaconda													
Drache													
Delphin													
Greif													
Hai													
Krokodil	Trieste ..	1906–7	179·9	18·0	..	1	197	3,000	26	4 3-pr.		25	
Moewe													
Narwal													
Pinguin													
Schwalbe													
Seehund													
Wal													
10 unnamed	Fiume ..	Bldg.											
Boa													
Cobra	Yarrow ..	1898–9	152·6	15·3	7·6	1	133	2,000	24·3	2 3-pr. Q.F.	3	24	30
Kigyo													
Python													
Viper	Yarrow ..	1896	147·6	14·9	7·6	1	130	2,000	26·5	2 3-pr. Q.F.	2	26	30
Natter	Yarrow ..	1896	150	17·5	8·8	2	152	2,300	26·5	2 3-pr. Q.F.	3	..	30

Two submarine boats building at Barrow, and three (300 tons) at the Germania Yard, Kiel.

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Araguary	Thornycroft	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Thornycroft	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Dias	Thornycroft	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
5 boats	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	28	2–1 prs.	3	24	30

Ten first-class boats building by Messrs. Yarrow, of which Goyaz, 150 tons, completed 1907.
Two submarine boats, Jacinto Gomes and Mello Marques.

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Chili.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Capitan Orella ..	Laird	1896	210	21·6	5·4	2	300	6000	30·17	1-12 pr. Q F. 5-6 pr.	2	65	90
Capitan Munoz Gamero.. ..	Laird	1896	210	21·6	5·4	2	300	6000	30·42	1-12 pr Q.F. 5-6 pr.	2	65	90
Teniente Serrano ..	Laird	1896	210	21·6	5.4	2	300	6000	30·35	1-12 pr. Q.F. 5 6 pr.	2	65	90
Guardia-Marina Riquelme	Laird	1896	210	21·6	5·4	2	300	6000	30·09	1-12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Merino Tarpa .. .. .. Capitan O'Brien ..	Laird	1901	210	21·6	5·4	2	350	6000	30	Do.	2	65	90
FIRST CLASS—													
Injeniero Hyatt, Cirujano Videla, Injeniero Mutilla, Guardia-Marina Contreras, Capitan Thompson, and Teniente Rodriguez (Viper type) ..	Yarrow ..	1896 1898	152·6	15·3	7·9	1	140	2200	27·5 27·2	3-3 pr. Q.F.	3	28	40
Tegualda, Quidora, and Fresia	Yarrow		87	10·9	..	1	..	400	..	..	..	..	
SECOND CLASS—													
1 boat	White	1892	60	9·6	5	1	15	270	19	..	1	..	
1 boat	La Seyne ..	1895	42	8·6	..	1	..	..	..	..	1	..	

The Thompson and Rodriguez were sent out in sections, and put together at Talcahuano and Valparaiso.

China.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
3 boats	Elbing ..	1886–97	144·3	16·4	7·5	1	128	1,400	24·2	4 1-pr. revs.	2	20	15
25 boats	Stettin, &c..	1886–87	110	13	4·9	1	65	1,000	19·5	1-pr. revs.	3	16	10
2 boats	Stettin ..	1897	123·5	21·7	..	..	120	..	20	2 1-pr.	3	20	
SECOND CLASS—													
1 boat	Foochow ..	1903	88·6	6·7	3·3	1	30	550	20·5				

About twenty boats only are said to be serviceable. Four boats building in Japan.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ormen	Copenhagen	1907	125	14·3	..	..	98	2,000	26	2 1-pr.	3	..	21
Hajen	Copenhagen	1896											
Havörnen	Copenhagen	1897	154·3	15·4	7·9	2	142	2,317	22·9	1 4·7-in. 1 1-pr.	3	..	..
Söbjörnen	Copenhagen	1898											
Delfinen	Thornycroft	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Havhesten	Thornycroft	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Thornycroft	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Thornycroft	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sölöven	Thornycroft	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Sóulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stören	Thornycroft	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Thornycroft	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9

Four destroyers and two boats are provided for; of these Messrs. Normand have delivered one—100 tons, 26 knots.

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France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Arbalète	Normand	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Arc	Châlon	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Arquebuse	Normand	1902	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Baliste	Rouen	1903	183·9	20·11	10·3	2	300	6,000	29·4	1-9pr. 6-3prs.	2	62	75
Bélier	Nantes	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Bombarde	Havre (F.&C.)	1903	183·9	20·11	10·3	2	300	6,000	30·5	1-9pr. 6-3prs.	2	62	75
Branlebas	Normand	1907	193·9	21·3	10·3	2	320	5,000	28	1-9prs. 6-3prs.	2	62	84
Carabine	Rochefort	1902	183·9	20·11	10·3	2	305	6,300	28	1-9pr. 6-3prs.	2	62	75
Carabinier		Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Carquois	Rochefort	1907	190·3	19·6	10·3	2	335	7,200	30	19-pr. 4 3-prs.	2	62	37
Catapulte	Havre (F.&C.)	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Chasseur	Normand	Bldg.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Claymore	Normand	1906	190·3	20·11	10·3	2	335	6,000	30·3	1-9pr. 6-3prs.	2	62	75
Cognée	Toulon	1907	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3pr.	2	61	75
Coutelas	Rochefort	1907	190·3	20·11	10·3	2	335	6,000	.8	1-9pr. 6-3prs.	2	62	75
Dard	Rouen	1903	183·9	20·11	10·3	2	310	6,500	29·4	1-9pr. 6 3prs.	2	62	75
Durandal	Normand	1899	180·5	20·8	10·3	2	300	5,000	28	1-9pr. 6-3prs.	2	62	84
Epée	Havre (F.&C.)	1900	190·3	20·8	10·3	2	335	5,700	26	1-9pr. 6-3prs.	2	62	75
Epieu	Normand	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Escopette	Rochefort	1900	183·9	20·8	10·3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Etandard	Bordeaux	Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Fanion	Bordeaux	Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Fanfare	Normand	1907	193·9	21·3	10·3	2	320	5,000	28	1-9pr. 6-3prs.	2	62	84
Fauconneau		Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Flamberge	Rochefort	1901	183·9	20 8	10·3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Fleuret	Rochefort	1907	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Francisque	Rochefort	1904	183·9	20·11	10·3	2	305	6,300	28	1-9pr. 6-3prs.	2	62	75
Fronde	Bordeaux	1903	183 9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	65
Gabion	Rouen	1907	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Glaive	Rochefort	Bldg.	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Grenadier		Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Hache	Toulon	1908	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Hallebarde	Normand	1899	180·5	20·8	10·3	2	305	5,300	27·2	1-9pr. 6-3prs.	2	62	84
Harpon	Bordeaux	1903	183·9	20·11	10·3	2	300	6,000	28	1 9pr. 6-3prs.	2	62	75
Hussar		Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Javeline	Nantes	1903	183·9	20·11	10 3	2	300	7,000	29·3	1-9pr. 6 3prs.	2	62	75
Massue	Toulon	Bldg.	190·3	20·11	10·3	2	335	6,000	28	1-9pr. 6-3prs.	2	62	75
Mortier	Rochefort	1906	190·3	20·11	10·3	2	335	6,300	28	1-9pr. 6-3prs.	2	62	75
Mousquet	Nantes	1902	183·9	20·11	10·3	2	300	6,300	30 2	1-9pr. 6-3prs.	2	62	75
Mousqueton	Châlon	1903	183·9	20·11	10·3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Obusier	Rochefort	1907	190·3	20·11	10·3	2	335	6,300	28	1-9pr. 6-3prs.	2	62	75
Oriflamme	Nantes	Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Pertuisane	Rochefort	1900	183·9	20·8	10.3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Pierrier	Rochefort	1906	190·3	20·11	10.3	2	335	6,300	28	1-9pr. 63-prs.	2	62	75
Pique	Havre (F.&C.)	1900	190·3	20·8	10.3	2	335	5,700	26	1-9pr. 6-3prs	2	62	75
Pistolet	Nantes	1903	183·9	20·11	10.3	2	300	6,000	28	1-9pr. 6-3prs.	2	62	75
Poignard	Rochefort	Bldg.	190·3	20·11	10.3	2	335	6,000	28	1-9pr. 6 3prs.	2	62	75
Rapière	Rochefort	1901	183·9	20·8	10·3	2	300	5,700	26	1-9pr. 6-3prs.	2	62	75
Sabre	Rochefort	1904	183·9	20·11	10·3	2	305	6,300	28	1-9pr. 6-3prs.	2	62	75
Sabretache	Nantes	1908	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Sagaie	Havre (F.&C.)	1902	183·9	20·11	10·3	2	300	6,000	30·1	1-9pr. 6-3prs.	2	62	75
Sape	Rouen	1907	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Sarbacane	Rochefort	1903	183·9	20·11	10·3	2	305	6,300	28	1-9pr 6-3prs.	2	62	75
Spahi		Pro.	210·6	21·9	..	..	430	..	28	5-9 prs.	3	..	..
Stylet	Rochefort	1905	190·3	20·11	10·3	2	335	6,300	..	1-9pr. 6-3prs.	2	62	75
Takou*	Elbing	1898	193·7	21·0	..	2	280	6,000	25	6-3 pr. q.f.	2	62	67
Tirailleur	Bordeaux	1907	206·9	21·8	9·7	3	410	7,800	28	6-9 pr.	2	..	48
Tromblon	Rochefort	1905	190·3	21 0	..	2	335	6,300	25	6-3 pr. q.f.	3	62	67
Trident	Rochefort	1907	190·3	19·6	10·3	2	335	7,200	30	1-9 pr.	2	62	37
Voltigeur	Nantes	Pro.	210·6	21·9	..	.	430	..	28	5-9 prs.	3	..	..
Yatagan	Nantes	1900	190·3	20·8	10·3	2	335	5,700	26	1-9pr. 6-3prs.	2	62	33
M 61-75 (15)		Pro.	190·3	20·11	10·3	2	450	6,800	28	1-9pr. 6-3prs.	2		
SEA-GOING—													
Agile	La Seyne	1889	139	14·7	7·7	2	121	1,100	20·4	3-3 prs.	2	26	14
Alarme	St. Nazaire	1889	151	15·7	8·3	2	169	1,400	20·5	2-3 prs.	4	30	40
Aquilon	Normand	1895	137·8	14·6	7·9	2	127	2,000	26·17	2-3 prs.	2	34	17
Archer	Normand	1893	138	14·7	6·5	2	131	1,250	21	2-3 prs.	2	26	17
Argonaute	St. Denis	1893	141	16·4	9·3	2	132	1,500	25·1	2-3 prs.	2	34	16
Audacieux	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	3	..	18
Aventurier	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	20·5	2-3 prs.	4	34	40
Averne	Havre (F.&C.)	1894	141	16·4	9·3	2	133	1,500	24·4	2-3 prs.	2	27	16
Borée	Bordeaux	1900	147·7	16·7	8·0	2	160	4,400	30	2-3 prs.	2	..	18
Bourrasque	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·41	2-3 prs.	2	..	18
Chevalier	Normand	1893	144·3	15·7	6·8	2	134	2,700	27·2	2-1 prs.	2	32	17
Corsaire	St. Denis	1893	160·5	15	5·4	2	171	2,500	25·5	4-1 prs.	2	32	15
Coureur	Chiswick	1888	147·5	14·5	4·6	2	129	1,550	23·28	4 Nords.	2	27	22
Cyclone	Normand	1898	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Dauphin	Havre (F.&C.)	1894	141	16·4	9·3	2	137	1,500	25·22	2-3 prs.	2	34	16
Défi	St. Nazaire	1889	151	15·7	8·3	2	173	1,400	21	2-3 prs.	4	30	40
Dragon	Normand	1892	138	14·7	8·2	2	129	1,400	25	2-3 prs.	2	26	15·5
Eclair	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·5	3-3 prs.	2	26	17
Flibustier	Normand	1894	143	16·4	9·3	2	132	1,500	23·5	2-3 prs.	2	34	16
Forban	Normand	1895	144·2	15·2	10	2	135	3,200	31·2	2-1 prs.	2	..	..
Grenadier	Normand	1892	138	14·7	8·2	2	129	1,400	25·25	2-3 prs.	2	26	15·5
Grondeur	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	24	2-3 prs.	2	27	20

* Captured from the Chinese at Taku, 1900.

N.B.—"F. & C." "Forges et Chantiers."
"Normand" means that the boat has been built at that firm's yard at Havre.

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France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
SEA-GOING—*cont.*													
Kabyle	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·6	3-3 prs.	2	27	17
Lancier	Normand	1893	138	14·7	8·2	2	128	1,400	25·79	2-3 prs.	2	26	15·5
Mangini	Nantes	1896	147·6	14·8	7·9	2	129	2,100	27·5	2-3 prs.	2	34	17
Mistral	Normand	1901	147·7	16·8	8·8	2	162	4,200	30	2-3 prs.	3	..	23
Mousquetaire	Havre (F.&C.)	1892	154	15·7	7	2	150	2,100	24·77	2-1 prs.	2	32	18
Orage	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·7	3-3 prs.	2	26	17
Ouragan	Nantes	1887	151	15·7	8·3	2	174	1,400	20	2-3 prs.	4	30	40
Rafale	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·47	2-3 prs.	2	..	18
Sarrasin	Bourdeaux	1893	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Simoun	Havre (F.&C.)	1901	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	3	..	18
Siroco	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2-3 prs.	3	..	23
Téméraire	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	21	2-3 prs.	4	30	40
Tourbillon	Bourdeaux	1892	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Tourmente	St. Denis	1893	141	16·4	9·3	..	132	1,500	21·6	2-3 prs.	2	25	15
Tramontane	Bordeaux	1900	147·7	16·7	8·0	2	160	4,400	30	2-3 prs.	2	..	18
Trombe	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	3	..	18
Turco	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5
Typhon	Havre (F.&C.)	1901	144·2	15·2	10 0	2	152	4,200	30	2-3 prs.	3	..	18
Vélocе	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	23·6	2-3 prs.	2	27	20
Zouave	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5
FIRST CLASS—													
126–129 (4 boats)	Normand	1889-0	118	13·2	8·6	1	80	1,250	21	2-1 prs.	2	21	10
145–149 (5 boats)	Normand	1891-3	118	13·2	8·7	1	79	1,300	23·9	2-1 prs.	2	21	10
152–154 (3 boats)	Normand	1892-3	118	13·2	8·7	1	80	1,300	24·6	2-1 prs.	2	21	10
155–157 (3 boats)	Bordeaux	1893	118	13 2	8·7	1	80	1,300	23	2-1 prs.	2	21	10
158–160 (3 boats)	Call	1893	118	13·2	8·7	1	80	1,300	23	2-1 prs.	2	21	10
161–163 (3 boats)	St. Nazaire	1892	118	13·2	8·7	1	80	1,300	23	2-1 prs.	2	21	10
164–166 (3 boats)	La Seyne	1892	118	13·2	8·7	1	79	1,300	23	2-1 prs.	2	21	10
167–169 (3 boats)	Creusot	1892	118	13·2	8·7	1	81	1,300	23	2-1 prs.	2	21	10
170, 171 (2 boats)	Normand	1893	118	13·2	8·7	1	80	1,300	23–24	2-1 prs.	2	21	10
172, 173 (2 boats)	Havre	1893–4	118	13·2	8·7	1	89	1,390	23–24	2-1 prs.	2	21	10
174–176 (3 boats)	Havre	1893–5	118	13·2	8·7	1	94	1,390	23-24	2-1 prs.	2	21	10
177–179 (3 boats)	Havre	1893	118	13·2	8·7	1	79	1,300	23–24	2-1 prs.	2	21	10
180–187 (8 boats)	Normand etc.	1894-5	118	13·2	8·6	1	80	1,500	25·7	2-1 prs.	2	21	10
188–191 (4 boats)	Havre, etc.	1893–4	118	13·2	8·6	1	80	1,500	24–2	2-1 prs.	2	21	10
192–194 (3 boats)	Havre, etc.	1894–5	118	13·2	8·6	1	82	1,300	23·55	2-1 prs.	2	21	10
195–200 (6 boats)	Havre, etc.	1894-5	319	13·2	8·7	1	80	1,300	23·5	2-1 prs.	2	21	10
201–205 (5 boats)	Normand	1897–8	121·4	13·4	8·6	1	84	1,700	25·9	2-1 prs.	2	23	10
208–211 (6 boats)	Bordeaux	1897–8	121·4	13·6	8·6	1	86	1,500	23·5	2-1 prs.	2	23	10
212–215 (4 boats)	Normand	1899	121·4	13·6	8·6	1	86	1,800	27	2-1 prs.	2	23	10
216–226 (11 boats)	Cherbourg, Toulon, etc.	1899–1902	121·6	13·6	8·6	1	86	1,500	23·5	2-1 prs.	2	23	10
227–235 (9 boats)	Bordeaux,etc.	1901	121·4	13·2	8·7	1	86	1,500	23·5	2-1 prs.	2	23	10
236–255 (20 boats)	Bordeaux,etc.	1902	121·4	13·2	8·7	1	90	1,500	23·5	2-1 prs.	2	23	10
256–257 (2 boats)	Bordeaux etc.	1900	124·8	13·2	8·7	1	97	2,000	26·0	2-1 prs.	3	24	10
258–261 (4 boats)	Bordeaux	1904	124·8	13·2	8·7	1	97	2,000	26·0	2-1 prs.	3	24	10
262–263 (2 boats)	Creusot	1902	124·8	13·2	8·7	1	97	2,000	26·0	2-1 prs.	3	24	10
264–265 (2 boats)	Bordeaux	1902	124·8	13·2	8·7	1	97	2,000	26·0	2-1 prs.	3	24	10
266–276 (11 boats)	Bordeaux etc.	1902	124·8	13·2	9·6	1	97	2,000	26·0	2-1 prs.	3	24	10
277–294 (18 boats)	Bordeaux,etc.	1904	124·8	14·0	9·6	1	97	2,000	26·0	2-1 prs.	3	26	10
295–317 (23 boats)	Normand, etc.	1905											
318–367 (50 boats)	Havre, etc.	1905–7											
368–369 (2 boats)	Toulon	1906	124·8	14·0	9·6	1	97	2,000	26	2-1 prs.	3	26	10
4 boats	Saigon	1905											
SUBMARINE—													
Aigrette*	Toulon	1904	117·6	12·9	8·3	1	172	200	10·5	..	..	20	..
Algérien	Cherbourg	1901	118	9·2	..	1	146	250	8 13	..	..	9	..
Alose	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Anguille	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Bonite	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Calypso*	Toulon	1907	154·3				344				7	..	..
Castor	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Cigogne*	Toulon	1904	117·6	12·9	8·3	1	172	200	10·5	..	..	20	..
Circé*	Toulon	1907	154·3				344				7	..	..
Dorade	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Emeraude	Cherbourg	1906	146	12·9	12·0	2	390	600	12	..	6	16	..
Espadon*	Cherbourg	1901	111·6	12·4	5·4	1	106-200	250	8-12	..	2	10	..
Esturgeon	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Farfadet	Rochefort	1901	135·8	9 5	9·5	1	185	..	8–12½	..	..	9	..
Français	Cherbourg	1901	118	9·9	..	1	146	250	8–13	..	..	9	..
Gnome	Rochefort	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Grondin	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Guêpe (Nos. 1 & 2)	Cherbourg	1908	65·8				44			..	2	..	..
Gustave Zédé	Toulon	1893	159	12·4	12·4	1	266	220	5–10	..	1	9	..
Gymnote	Mourillon	1888	56·5	5·11	6·0	1	30	55	4-6		2	4	..
Korrigan	Rochefort	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Loutre	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Ludion	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Lutin	Rochefort	1903	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Lynx	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Méduse	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Morse	Cherbourg	1899	118	9·0	9·0	1	144	360	8-12·3	..	1	9	..

* Submersibles.

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France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
SUBMARINE—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				TONS.
Naiade	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Narval‡	Cherbourg	1899	111·6	12·4	5·4	1	106–206	250	8–12	..	2	9	..
Opale	Cherbourg	1906	146	12·9	12·0	2	390	600	12	..	6	..	..
Otarie	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Oursin	Rochefort	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Perle	Cherbourg	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Phoque	Rochefort	1904	77	7·6	8·0	1	68	60	8	..	..	5	..
Protée	Cherbourg	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Rubis	Cherbourg	1907	154·3	12·9	12·0	2	390	600	12	..	6	16	..
Saphir	Toulon	Bldg.	146	12·9	12·0	2	390	600	12	..	6	..	..
Silure‡	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Sirène‡	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Souffleur	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Thon	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Topaze	Cherbourg	Bldg.	146	12·9	12·0	2	390	600	12	..	6	..	..
Triton‡	Cherbourg	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Truite	Toulon	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Turquoise	Toulon	Bldg.	146	12·9	12·0	2	390	600	12	..	6	..	..
X	Cherbourg	1904	122·8	10·2	7·6	2	168	220	10¼	..	..	..	..
Y	Toulon	1905	142·8	9·10	9·10	1	213	250	11	..	..	..	..
Z	Rochefort	1904	135·8	9·10	9·10	1	202	190	11	..	..	..	..
Omega	Toulon	1905	160·6	13·9	9.0	1	301	330	11	..	4	20	..
Pluviôse Ventôse, Nivôse, Germinal, Floréal, Prairial, Messidor, Thermidor, Fructidor, Vendémiaire Brumaire, Frimaire‡	Cherbourg	19 7 & Bldg.	160	16·4	13 6	2	398	700	12	..	7	24	..
Q 61		Pre.	36	..	..	1	21	..	..	..	..	..	..
Papin, Fresnel, Berthelot‡	Rochefort	Bldg.	160	16·4	13·6	2	398	700	12	..	7	24	..
Monge, Ampère, Gay-Lussac‡	Toulon	Bldg.	160	16·4	13·6	2	398	700	12	..	7	24	..
Q 70–74‡ (5)	Cherbourg	Pro.	160	16·4	13·6	2	398	700	12	..	7	24	..
Q 75–79‡ (5)	Rochefort												
Q 80–89‡ (10)	Toulon												
Q 90–99‡ (10)	Toulon, Cherb.	Pro.	..	..	..	..	..	..	..	..	..	..	..
Q 100–104‡ (5)	..	Pro.	..	..	..	..	..	..	..	..	..	..	..
A ‡	Cherbourg	Bldg.	197	..	..	..	577–810	..	10–15	..	..	..	..
B ‡	Cherbourg	Bldg.	210	..	..	..	530–623	..	10–15	..	..	..	..
C ‡	Rochefort	Bldg.	184	..	..	..	550–735	..	10–15	..	..	..	..

‡ Submersibles.

Germany.

Name or Number.	Where built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
D 3, D 4 (2 boats)	Elbing	1888	184	21·8	9·6	2	300	2,000	20	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 5, D 6 (2 boats)	Elbing	1888–9	190 3	23	9·6	2	320	3,000	22½	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 7, D 8 (2 boats)	Elbing	1890	190·3	23	9·9	2	380	3,500	22½	6 Q F.	3		
D 9	Elbing	1894	197·0	24·3	9·9	2	380	4,500	26	6 Q.F.	3		
D 10	Chiswick	1898	211·9	19 6	8·1	2	310	5,800	28·5	5 3-pr. Q.F.	3	52	80
D 11, D 12	Chiswick	1900	218·6	20·9	8·7	2	333	7,000	31	1 12-pr. 5 6-p s.	2	59	40
S 90–101	Elbing	1900	200	21	8·9	2	350	6,000	27 5	3 3-pr. Q F.	3		
S 102–107	Elbing	1901	200	23	8·9	2	350	6,000	27·5	3 3-pr. Q.F.	3		
G 108–113	Kiel(Germania)	1901–2	200	22	8·9	2	350	6,000	29·2	3 3-pr. Q.F.	3	49	100
S 114–119	Elbing	1903	200	23	8·9	2	350	6,000	29·2	3 3-pr. Q F.	3	49	100
S 120–125	Elbing	1904–5	200	23	8·9	2	350	6,000	29·2	3 3-pr. Q.F.	3	49	100
S 126–131*	Elbing	1904–5	205	23	..	2	420	6,000	30	3 6-pr.	3	56	100
G 132–136	Kiel (Germania)	1906	207·4	23	8·9	2	420	6,500	28	4 6-pr.	3	..	..
G 137	Kiel(Germania)	1907	224·4	25·4	9·8	3	570	10,000	32	1 14-pr.33 pr.	3	72	170
S 138–149	Elbing	1906–7	331	25·7	8·9	2	530	10,000	30	1 14-pr.33-pr.	3	72	170
V 150–161	Stettin(Vulcan)	1907–8	269	25·7	10·0	2	670	10,500	30	2 14-pr., 2 M.	3	83	175
Taku (ex Hai Ying)	Elbing	1898	183·7	21·0	..	2	280	6,000	30	6 3-prs.	2	..	67
FIRST CLASS—													
S 42—S 65 (24 boats)	Elbing	1892	150	15·6	6·7	..	85–88	1,600	20–22½	2 1-pr. revs.	2	..	17
S 66—S 73 (8 boats)	Elbing	1893	154·3	16·4	..	2	110 145	1,600	..	..	3		
S 74—S 87 (14 boats)	Elbing	1894–8	158·2	16·9	9·0	2	140	2,300	26	2 1-pr. revs.	3	..	32
G 88—G 89 (2 boats)	Kiel(Germania)	1898	154·3	16·5	..	..	160	2,500	26	2 mach.	3	22	

The Estimates of 1908 provide for the building of two divisions of destroyers (12 boats). A submarine boat (U 1), 180 tons, 128 ft. long, 8 ft. 10 in. beam, submerged displacement 240 tons, speed 12 and 9 knots, launched at the Germania Yard, August 30, 1903; another in 1906.

* S 125 and G 137 have Parsons turbines.

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Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naukratoussa .. Thyella .. .. .. Sfendoni .. .. .. Lonchi .. .. .. Nike .. .. .. Storm .. .. .. Aspis .. .. .. Doxa .. .. .. Velos .. .. .. Zolbeis	Yarrow .. Stettin (Vulkan)	1906 1906	220 220	20·6 20·6	7·2 7·2	2 2	350 350	.. ..	31 30	2 12, 4 6-pr. 2 12, 4 6-pr.	2 2	58 58	80 80
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	20
6 boats	Yarrow ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs	2	12	9

Italy.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Fulmine	Sestri (Odero)	1898	200	20·4	5·4	2	298	4,800	28	1 12-pr. 3 6-pr. Q.F.	3	43	60
Lampo .. .. .. Freccia .. .. .. Dardo .. .. .. Strale .. .. .. Euro .. .. .. Ostro .. .. .. Nembo .. .. .. Turbine	Elbing (Schichau)	1899 1901	196·8	21·3	5·8	2	320	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Aquilone .. .. .. Borea .. .. .. Meteoro .. .. .. Tuono	Naples (Pattison)	1901 1902	210	19·4	7·6	2	330	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	66
Zeffiro .. .. .. Espero	Naples (Pattison)	1904	210	19·4	7·6	2	330	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Orione .. .. .. Orsa .. .. .. Olympia .. .. .. Orfeo	Genoa (Ansaldo)	1905 1906	213·6	20·0	7·6	2	325	6,000	28¼	6 6-pr.	3		40
Bersagliere .. .. Artigliere .. .. .. Granatiere .. .. Lanciere	Genoa (Ansaldo, Armstrong)	1906 1907	211·6	20·0	7·6	3	344	6,200	28¼	4 12-pdr.	3	55	82
FIRST CLASS—													
5 boats { Aquila .. Sparviero Nibbio .. Avvoltoio Falco .. }	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Pellicano	Sestri (Odero)	1899	157·4	19	14·8	2	147	2,700	25	2 3-prs.	2	28	24
Condore	Sestri (Ansaldo)	1898	154·3	16·8	6·9	2	136	2,500	27	2 3-prs.	2	27	16
Sirio .. .. .. Sagittario .. .. Spica .. .. .. Scorpione .. .. Serpente .. .. .. Saffo	Elbing ..	1905 1906 1906 1906 1905 1906					215						
Alcione .. .. .. Ardea .. .. .. Albatros .. .. .. Alcrone .. .. .. Astore .. .. .. Arpia	Odero	1905 1906											
Gabbiano	Spezia	1907											
Pegaso	Naples (Pattison)	1905	164	17·4	7·0	2	200	3,000	25·4 26·6	3 3-pr.	3		40
Perseo .. .. .. Procione .. .. .. Pallade .. .. .. Cigno .. .. .. Cassiopea .. .. Calliope .. .. .. Clio .. .. .. Centauro .. .. .. Canopo	Naples (Pattison)	1905 1905 1906 1907											
SECOND CLASS—													
Nos. 78, 79 (2 boats)	Venice ..	1896	..	..	..	..	..	..	..	..	3	20	24
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893–94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894–5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
SUBMARINE—													
Delfino	Spezia	1894	78·6	10·1	..	1	111	150	10–12	..	2	12	..
Glauco, Squalo, Narvalo, Otaria, Tricheco	Venice, &c.	1906 1907	120	14·3	..	..	180/230	..	15	..	2	..	..
Unnamed	Muggiano ..	Bldg.	137·9	14·3	..	..	180/230	..	16	..	2	..	..

The new Italian destroyers have Thornycroft water-tube boilers.

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Japan.

Name or Number.	Where Built.	Launched.	Dimensions			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Murakumo	Thornycroft	1898											
Shinonome	Thornycroft	1898											
Yugiri	Thornycroft	1898	210·0	19·5	7·2	2	307	5,800	30 to 31	1 12-pr., 5 6-prs.	2	54	80
Shirauri	Thornycroft	1899											
Kagerou	Thornycroft	1899											
Usugumo	Thornycroft	1900											
Shirakumo	Thornycroft	1901	216·7	20·7	8·3	2	373	7,400	31	1 12-pr., 5 6-prs.	2	59	96
Asashio	Thornycroft	1902											
Ikadsuchi	Yarrow ..	1898											
Inadsuma	Yarrow ..	1899	220·0	20·6	9·6	2	311	6,000	31	1 12-pr., 5 6-prs.	2	55	95
Akebono	Yarrow ..	1899											
Sazanami	Yarrow ..	1899											
Oboro	Yarrow ..	1899	220·3	20·6	9·6	2	311	6,000	31·62	1 12-pr., 5 6-prs.	2	..	90
Nijl	Yarrow ..	1899	220·3	20.6	9·6	2	308	6,000	31·15	1 12-pr., 5 6 -prs.	2	..	90
Kasumi	Yarrow ..	1902	220·3	20·6	9·6	2	335	6,000	31	1 12-pr., 5 6-prs.	2	..	..
Asagiri	Yokosuka ..	1902											
Hurusame	Yokosuka ..	1902	220·3	20·6	9·6	2	374	6,000	29	1 12-pr., 5 6-prs.	2	..	..
Murasame	Yokosuka ..	1902											
Yamahiko	Port Arthur	1903											
Fumizuki	Port Arthur	1903	196·9	18·4	11·5	2	250	6,000	27	1 12-pr., 5 3-prs	2	..	80
Satsuki	St. Petersburg	1903											
Hatsushima	Yokosuka ..	1905											
Yayoi	Yokosuka ..	1905											
Kisaragi	Yokosuka ..	1905											
Hibiki	Yokosuka ..	1906											
Wakaba	Yokosuka ..	1905											
Hatsuyuki	Yokosuka ..	1906											
Kamikase	Yokosuka ..	1905											
Ariake	Yokosuka ..	1905											
Fubuki	Yokosuka ..	1905											
Arare	Yokosuka ..	1905											
Yunagi	Maizuru ..	1906											
Oite	Maizuru ..	1905											
Asakase	Kobe	1905											
Harukase	Kobe	1905											
Shigure	Kobe	1906											
Hatsuharu	Kobe	1906											
Yuguri	Sasebo	1905											
Yudachi	Sasebo	1906	220·3	20·6	9·6	2	374	6,000	29	6 12-pr.	2	..	..
Mikadzuki	Sasebo	1906											
Nowake	Sasebo	1906											
Uschio	Kure	1905											
Nenohi	Kure	1905											
Shiratsuyu	Nagasaki ..	1906											
Shirayuki	Nagasaki ..	1906											
Matsukase	Nagasaki ..	1906											
Shirotaye	Nagasaki ..	1906											
Asatsuyu	Osaka	1907											
Hayakase	Osaka	1906											
Kikutsuki	Uraga	Bldg.											
Minatsuki	Uraga	Bldg.											
Nagatsuki	Uraga	1907											
Utsuki	Uraga	1907											
Ironami		Bldg.											
Uranami		Bldg.											
Ajanami		Bldg.											
FIRST CLASS—													
Hayabusa	Normand ..	1898											
Kasasagi	Normand ..	1899	147·7	16·0	8·2	2	150	4,200	30	1 6-pr., 2 3-prs.	3	26	30
Manadzuru	Normand ..	1899											
Chidori	Normand ..	1900											
Shirataka	Elbing ..	1899											
Aotaka	Kure	1903											
Hato	Kure	1903											
Hibari	Kure	1903											
Kari	Kure	1903											
Kiji	Kure	1903	147·7	16·0	8·2	2	150	4,200	27	1 6-pr., 2 3-prs.	3	26	30
Tsubame	Kure	1903											
Hashitaka	Kawasaki ..	1902											
Kamome	Kure	1904											
Otori	Kawasaki ..	1904											
Sagi	Kure	1902											
Usuri	Kure	1902											
Fukuriu	Kiel	1895	..	..	..	..	115	..	..	..	..	..	..
SECOND CLASS—													
2 boats	Kobe	1901	..	..	..	..	83	..	..	..	..	..	..
10 boats	Yarrow ..	1900	152·6	15·3	7·9	..	..	1,900	27	2 3-prs	3	..	36
16 boats	Elbing ..	1891–9	..	..	..	..	..	..	..	..	..	..	..
1 boat (No. 24) ..	Normand ..	1891	118	13·1	6·9	1	80	1,200	23	2 1-prs.	2	21	10
2 boats	Normand ..	1898	121·4	13·6	8·6	1	86	1,800	27	1 3-pr.	2	..	10

Five submarine boats, 150 tons displacement, have been built, and two are building.
A destroyer of 1100 tons is said to be building in Japan.

Mexico.

Mexico has four first-class boats building or projected.

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Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ardjoeno	Yarrow	1886	125	13	6	1	83		21	2 1-prs.	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Yarrow	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Yarrow	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Yarrow	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Nobo	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Scylla	Yarrow	1900	130	13·6	6·0	1	77	1,200	24·3	2 1-prs.	3	18	20
Hydra	Yarrow	1900	130	13·6	6·0	1	77	1,200	24·4	2 1 prs.	3	18	20
Ophir	Yarrow	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Pangrango	Yarrow	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Rindjani	Yarrow	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Smeroe	Fijenoord	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Tangka	Fijenoord	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Wajang	Fijenoord	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Minotaurus, Python	Flushing	1904	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Zeeslang, Krokochl, Draak, Sfinx, Scylla	Flushing	1905	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Meijndert Jentjes, Johan van Brakel, Van de Rijn, Willem Willemsze	Flushing, Rotterdam, & Fijenoord	1904	154·3	16·5	7·9	1	144	2,000	25	2 3-prs.	3	24	..
G 5–G 8	Do.	1906	154·3	16·5	7·9	..	144	2,000	..	2 3-prs.	3	24	..

All the Poplar destroyers have Yarrow water-tube boilers, and the later ones are fitted for the consumption of oil fuel. One submarine boat, Luctor et Emergo (120 tons).

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Valkyrien	Elbing	1896	190	24·3	9·3	1	374	3,300	23·2	2 12-pdrs. 4 1-pdrs.	2	59	90
2 others	Bldg.		226	25·0	..	..	550	7,500	27·0	6 12-pdrs.	2	71	95
FIRST CLASS—													
Varg (8), Raket (9)	Christiania	1894	111·5	12·4	..	1	43	..	..	..	2	..	..
Hval, Delfin, Hai (3 boats)	Elbing	1896	128·0	15·0	6·9	1	84	1,100	24·5	2 1·4-in. Q.F.	2	..	..
Storm, Brand, Trods	Christiania	1899	128·0	15·0	..	1	84	1,100	23	2 1·4-in. Q.F.	2		
Laks, Sild, Sael, Skrei	Christiana	1900	128·0	15·0	6·9	1	84	11,000	23	2 1·4-in.	2	..	..
Kjeck, Hvas, Dristig, Kvik, Djerv, Blink, Glint, Hauk, Falk	Christiana	1898 1903	111·5	14·5	6·3	1	65	650	19	2 1·4-in.	2	..	..
Skarv, Teist, Lom, Jo, Grib	Christiana	1906–7	134·5	14·9	..	1	100	1,700	25·0	2 3-pr.	..	..	..
Ravn, Orn	Christiana	1903	119	14·9	6·4	1	73	1,035	22·5	2 1·4-in.	2	14	13

A submarine (260 tons) in hand at the Germania Yard, Kiel.

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing	1890–92											
Mindro	Lisbon	1893	..	..	..	..	..	..	12				
SUBMARINE—													
Plongeur	Lisbon	1892	72·1	11·5	..	..	100	..	6		4	6	

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Roumania.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet	Feet.		Tons.		Knots.				Tons.
Naluka	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Sborul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Smeul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Second Class—													
Solmul	Yarrow ..	1882	63	8	3	1	12	150	16·5	..	..	8	
Vulturul	Yarrow ..	1882	63	8	3	1	12	150	16·5	..	..	8	

8 100 ft. Torpedo Vedette Boats built by the Thames Ironworks.

Russia.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.													
Destroyers—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Kondratenko, Okhotnik, Pogranitschnik, Siberskij-Strelok ..	Abo and Helsingfors	1905	250·3	27·0	8·9	2	625	7,300	25–26	2 12-pdrs. 6 6-pdrs.	3	100	191
Amuretz, Gaidamak, Ussurietz, Vsadnik ..	Kiel (Germania)	1905 1906	232·9	23·7	7·9	2	560	6,500	25–26	2 12-prs. 6 6-prs.	3	98	180
Emir Bukharsky, Dobrovoletz Finn, Moskvityanin	Helsingfors	1905	238	27·0	8·6	2	580	6,500	25–26	2 12-pdrs. 6 6-pdrs.	3	98	134
Donskoi – Kasak, Kasanetz, Sabaikaletz, Steregushtshi, Strashny, Trukhmenetz, Ukraina, Voiskovoi	Riga	1904 1906	239·9	23·7	7·6	2	508	6,200 7,020	25–27	2 12-pdrs. 4 6-pdrs.	2	90	50 120
Prytki .. .. .. Revy, Retivy, Ryany, Rezviyi, Prosorlivy,	Poplar	1895	190	18·6	7·0	2	240	4,400	29.7	1 12-pr, 3 3-pr	2		
Pilky, Ridny, Poslushny, Protchny, Porataushtchi, Prontsiteliny, Podvitany	Abo, Ishora & Nevsky ..	1898	196·9	18·4	11·5	2	240	3,800	27	1 12-pr, 3 3-pr	2	55	53
Bravi, Vidny, Bodry	Nevsky and Ishora ..	1900–2	196 9	18·4	11·5	2	350	6,000	27	1 12-pr, 5 3-pr	3	62	80
Grozni, Grosiashtchi	St. Petersburg	1904	196·9	18·4	11·5	2	350	6,000	27	1 12-pr, 5 3-pr	3	62	80
Tverdy, Totschny, Trevozhny	Abo	1905	196·9	18·4	11·5	2	240	6,000	27	1 12-pr, 5 3-pr	3	62	80
Iskousny, Ispolnitelni, Kriepky, Legky	La Seyne ..	1905	185·9	21·0	7·5	2	324	5,600	26	1 12-pr, 5 3-pr 2 M	2	60	30 100
Lovki, Letutshi, Lichoi	Havre (Normand)	1905	185·8	21·0	7·5	2	324	5,600	27·5	1 12-pr, 5 3-pr 2 M	2	60	30 100
Bolevoi, Bditelny, Burni, Vnimatelni, Vnushitelni, Vynoslivny, Sergieff, Yurasovsky, Svviereff, Dmitrieff	Elbing Schichau	1905–6	208·9	23·0		2	365	6,500	28		3		95
Slini, Storozhevoi, Stroiny, Rasyashtshy, Rastoropny, Burakoff, Dyelni, Dostoiny, Deyatelni, Myetky, Molodetsky, Moshtshny, Malieieff, Anastosoff	St. Petersburg and Ochta	1905 1907	185·9	21·0	7·5	2	335 to 5,600		26	1 12-pr, 5 3-pr 2 M	2	60	30 100
First Class—													
Aspen	Ishora	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Domeness	Putiloff ..	1895	127 9	15·7	6·9	1	98	1,250	21	..	2	..	17
Hogland	Ishora	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Nargen	Ishora	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Rochensalm	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Sestoretsk	Normand ..	1894	118	13·2	8·6	1	80	1,300	24	2 1-prs.	2	21	10
Transund	Ishora	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
2 boats	St. Petersburg	1896	128	16	6·9	2	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	1897	138	14·7	9·9	2	120	..	25	..	2	26	
8 boats	Nevsky ..	1898	..	..	..	..	118						

19 other boats, built in 1890–95.

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Russia—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
BLACK SEA.													
DESTROYERS—													
Baranoff, Shestakoff, Pustchin, Sazarenny	Nicolaieff ..	1907 & Bldg.	241·6	27·0	7·9	2	614	6,500	25	6 12-pdrs.	3	90	200
Zavidni, Zavetni, Zharki, Zhutki, Zhivoi, Zhivulka, Zhivutshtshy ..	Nicolaieff ..	1903-4	210	21·2	7	2	350	5,500	27	1 12-pr,5 3-pr	2		
Stremitelni, Strogi, Smetlivy, Svirepy†	Abo	1901	190·4	18·5	11·5	2	240	3,800	27	1 12-pr,3 3-pr	2	..	60
Zadorni, Zorki, Zvonki	Nicolaieff ..	1903	210	21·2	7	2	350	5,500	27	1 12-pr,5 3-pr	2		
FIRST CLASS—													
A. B. C. (3 boats) ..	Nicolaieff ..	1893	126	..	..	..	81	..	21				
Adler	Elbing ..	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1 prs.	3	24	40
Anakria	Elbing ..	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
D. E. (2 boats) ..	Sebastopol ..	1893	128	..	..	..	85	..	22				
FAR EAST.													
DESTROYERS—													
Bespochtchadni, Bestrachni, Beschumni (3 boats)	Elbing ..	1899	196·9	18·4	11·5	1	350	6,000	27	1 12-pr,5 3-pr	2		
Grozovoi, Vlastni ..	Havre(F.&C.)	1900-2	186·0	20·8	10·3	2	300	5,000	28	1 12-pr 5 3-pr	2	..	80
Boiki	Nevsky ..	1900	196·9	18·4	11·5	1	350	6,000	28	1 12-pr,5 3-pr			

† These destroyers proceeded from Cronstadt to Sebastopol, unarmed, January, 1903, passing the Dardanelles by consent of the Porte.

Submarine Plotr Koschka (experimental), Delfin (77 ft., 175 tons), Graf Sheremeteff completed at St. Petersburg; Akula, Alligator, Drakon, Kalman, Krokodil, Minoga (400 tons, Lake type) building; also Kefal, Akula, Makrel, Bytshok, Nalins, Kata, Paltus, Delfin, Karp, Kambala, Karas (240 tons) built at Kiel; 18 others built or building, Lossos in the Black Sea.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Terror	Clydebank ..	1896	220	22	5·6	2	300	6,000	28	2 12-pr. 2 6-pr. 21-pr.	2	67	100
Audaz													
Osado	Clydebank ..	1897	225	25·6	5·8	2	400	7,500	30	2 14-pr. 2 6-pr. 21-pr.	2	70	90
Proserpina													
FIRST CLASS—													
Acevedo	Chiswick ..	1885	117·7	12·5	6·2	1	63	660	20·1	2 mach.	2		
Azor	Poplar	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Bustamente	Normand ..	1887	126	10·9	..	..	63	800	..	3 3-prs.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcón	Poplar	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
SUBMARINE—													
Peral	Carraca ..	1889	70	8·5	..	2	87	60	10				

Azor, Halcón and Orion re-boilered by Yarrow (water-tube).

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Sweden.

Torpedo Boats.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Destroyer—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Mode	Yarrow	1902	220·3	20·6	8·9	2	400	6,800	32·4	1 12-pr. 5 6-prs.	2	55	95
Magne	Thornycroft	1905	216·7	20·0	7·2	2	350	7,400	30·5	1 12-pr. 5 6-prs.	2	59	96
Wale	Malmo	1906											
Ragnar	Malmo	Bldg.	216·9	20·8	8·2	2	430	7,200	30·0	2 12-prs. 4 6-prs.	2	..	..
Sigurd	Gothenburg	Bldg.											
First Class—													
Komet	Elbing	1896	128	15·9	6·11	1	92	1,056	23·0	2 1·9-in. Q.F.	2	16	17
Blixt	Carlskrona	1898	128	15·9	6·11	1	92	1,260	23·5	2 1·9-in. Q.F.	2	18	17
Meteor	Carlskrona	1899	128	15·9	6·11	1	92	1,330	23·8	2 1·9-in. Q.F.	2	18	17
Stjerna	Carlskrona	1899	128	15·9	6·11	1	92	1,250	23·4	2 1·9-in. Q.F.	2	18	17
Orkan	Carlskrona	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Vind	Carlskrona	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Bris	Carlskrona	1900	128	15·9	6·11	1	92	1,250	23 5	2 1·5-in. Q.F.	2	18	17
Virgo	Carlskrona	1902	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Mira	Carlskrona	1902	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Orion, Sirius, Kapella	Carlskrona	1903	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Pleiad	Normand	1905	125	15	6·6	1	96	1,900	26	2 1·5-in. Q.F.	2	18	—
Vega, Vesta	Carlskrona	Bldg.	125	17·5	8·6	1	105	1,900	25·5	1 6-pr. 1 1·4-in.	2	..	..
Spica, Astrea, Iris, Thetis	Bergsund and Gothenburg	Bldg.	125	17·5	8·6	1	105	1,900	25·5	1 6-pr. 1 1·4-in.	2	..	..
2 boats (9 and 11)	Carlskrona	1894	126·8	13·11	7·7	1	86	850	19·5	2 mach.	2	16	15
Second Class—													
No. 75	Stockholm	1892	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 77	Carlskrona	1891	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 79	Stockholm	1902	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 81	Stockholm	1902	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 83	Stockholm	1903	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 85	Stockholm	1903	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
Third Class—													
Nos. 141, 143, 145, 147, 149 (5 boats)	Stockholm	1879 1890	55·0	10·7	4·1	2	21	80	10	..	2	..	1·5
Submarine—													
Enroth	Stockholm	1902	82·0	13·0	11·6	2	146	100	12–11	..	1	..	..
Hajen	Stockholm	1903	65·0	11·6	..	..	120	200	10–7	..	..	..	..

Provision is made for two destroyers and six torpedo boats in 1907–8.

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Destroyers—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Berk-Efshan	Kiel	1894	187	21·6	..	2	270	1,200	25	6 1-pr. revs.	2		
Taijar	Kiel	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
Samsoun	Bordeaux	Bldg.	184·9	19·6	9·6	2	280	..	28	1 9-pr. 6 3-pr.	2	..	26
Basra, 2 others													
First Class—													
Eliagot, Ac-Hisar	Sestri Ponente	1904	165·8	18·6	4·5	..	165	2,200	27				
Angora, Urfa, Antalia, Tokat, Deradj, Kulahia, Moosul	Sestri Ponente	1906	165·8	18·6	4·5	..	165	2,200	24				
A. B	Sestri Ponente	1901	166	18·6	4·0	2	145	2,400	26	2·1 pr.	2	..	16
Edjder (No. 10)	Kiel	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
5 boats	Kiel	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
2 boats	Kiel	1892	127	..	..	..	..	..	22				

Four torpedo boats have been ordered in France.

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United States.

Name.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament. Guns.	Torpedo Tubes.	Complement.	Maximum Coal Capacity.
Destroyers—			ft. in.	ft. in.	ft. in.		Tons.		Knots.				Tons.
Nos. 17, 18 ..	Cramp.. ..	Bldg.	289 0	27 0	..	2	700	10,000	..	5 12-pr.	..	..	..
Nos. 19, 20, 21	Bath,Me.&N.Y.												
Bainbridge ..	Philadelphia	1901	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.*	2	64	139
Barry	Philadelphia	1902	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Chauncey.. ..	Philadelphia	1901	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Dale	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Decatur	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Hopkins	Wilmington	1902	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Hull	Wilmington	1902	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Lawrence.. ..	Quincy, Mass.	1900	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Macdonough ..	Quincy, Mass.	1901	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Paul Jones ..	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Perry	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Preble	San Francisco	1901	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Stewart	Morris Heights	1902	245 0	23 7	6 6	2	420	7,000	29·3	2 12-pr., 5 6-pr.	2	64	139
Truxtun	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Whipple	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Worden	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Bagley	Bath	1900	157 0	17 0	4 7	2	167	3,920	28	3 3-pr.	3	29	..
Bailey	Morris Heights	1899	205 0	19 0	6 0	2	235	5,000	30	4 6-pr.	2	..	20
Barney	Bath	1900	157 0	17 0	4 7	2	167	3,920	28	3 3-pr.	3	29	..
Biddle	Bath	1900	157 0	17 0	4 7	2	167	3,910	28	3 3-pr.	3	29	..
Blakely	Boston ..	1902	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
De Long	Boston ..	1901	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Du Pont	Bristol, R.I.	1897	175 0	17 8	4 8	2	165	3,400	28·58	4 1-pr.	3	32	76
Farragut	San Francisco	1898	213 6	20 8	6 0	2	273	5,600	30	4 6-pr.	2	..	76
Foote..	Baltimore ..	1896	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Goldsborough ..	Portland, Ore.	1902	194 8	20 5	5 0	2	247·5	5,880	30	4 6-pr.	2	..	131
Nicholson ..	Elizabethport	1902	174 6	17 0	4 6	2	174	3,500	26	3 3-pr.	3	29	..
O'Brien	Elizabethport	1902	174 6	17 0	4 6	2	174	3,500	26	3 3-pr.	3	29	..
Porter	Bristol, R.I.	1896	175 0	17 8	4 8	2	165	3,800	28·63	4 1-pr.	3	32	76
Rodgers	Baltimore ..	1896	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Rowan	Seattle, Wash.	1898	170 0	17 0	5 11	2	182	3,200	26	4 1-pr.	3	32	60
Shubrick	Richmond ..	1899	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stockton	Richmond ..	1899	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stringham ..	Wilmington	1899	225 0	22 0	6 6	2	340	7,200	30	7 6-pr.	2	..	120
Thornton	Richmond	1900	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Tingey	Baltimore ..	1902	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Wilkes	Morris Heights	1901	175 0	17 6	4 8	2	165	3,000	26·25	3 3-pr.	3	29	70
Winslow	Baltimore ..	1897	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Sea-Going—													
Cushing	Bristol, R.I.	1890	138 9	14 3	4 11	2	105	1,720	22·5	3 1-pr.	3	23	36
Davis	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Dahlgren	Bath	1899	147 0	16 4	4 7	2	148	4,200	30·5	4 1-pr.	2	..	32
Ericsson	Dubuque, Iowa	1894	149 7	15 6	4 9	2	120	1,800	24	4 1-pr.	3	23	35
Fox	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Morris	Bristol, R.I.	1898	138 3	15 6	4 1	2	105	1,750	24	3 1-pr.	3	..	28
Somers	Schichau, Elbing ..	1898	149 3¾	17 5	..	2	145	..	..	..	..	..	..
T. A. M. Craven	Bath	1899	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	22
Third Class—													
Gwin..	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	20·88	1 1-pr.	2	..	8
Mackenzie ..	Philadelphia	1898	99 3	12 9	4 3	1	65	850	20	1 1-pr.	2	..	15·3
McKee	Philadelphia	1898	99 3	12 9	4 3	1	65	850	19·82	2 1-pr.	2	..	..
Talbot	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	21·15	1 1-pr.	2	..	8·8
Submarine—													
Adder	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Grampus ..	S. Francisco	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Holland	Elizabethport	1896	54 0	10 3	..	1	74	150	8	1 dynamite	1	5	..
Moccasin ..	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Pike	S. Francisco	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Plunger	Elizabethport	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Porpoise	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Shark	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Cuttlefish.. ..	Quincy, Mass.	1906											
Viper	Quincy, Mass.	Bldg.	80 6	13 0	..	..	170		8¼—10				
Tarantula.. ..	Quincy, Mass.												
Octopus	Quincy, Mass.	1906	106 0	..	..	..	273						

* Guns of destroyers of this class are Driggs Semi-Automatic Quick-Firers.

With the exception of the Lawrence, Macdonough, and Stewart, all the destroyers in the first alphabetical list have Thornycroft water-tube boilers. The Farragut, Goldsborough and Stringham have also boilers of this type.

The submarine Fulton, of the Holland type, built experimentally by the Holland Company, was launched June, 1901. Three other submarines are to be built.

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PLANS

OF

BRITISH AND FOREIGN SHIPS.

b

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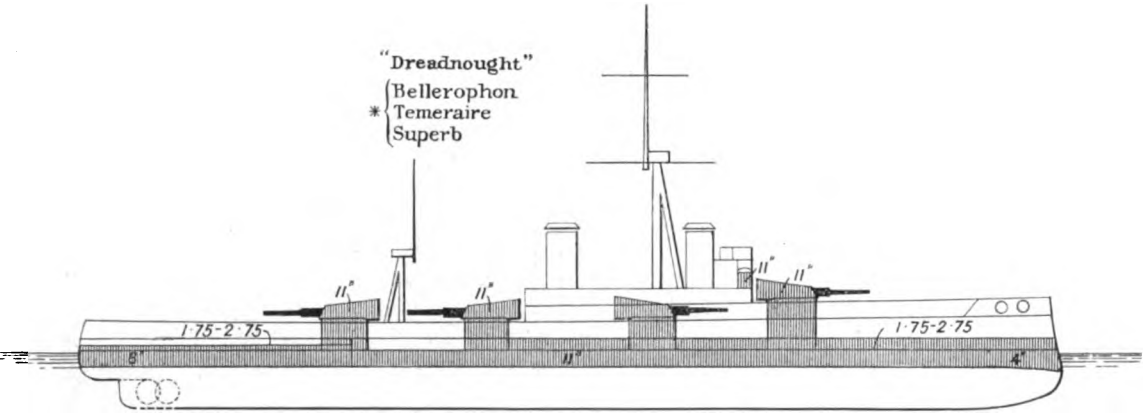
GREAT BRITAIN.

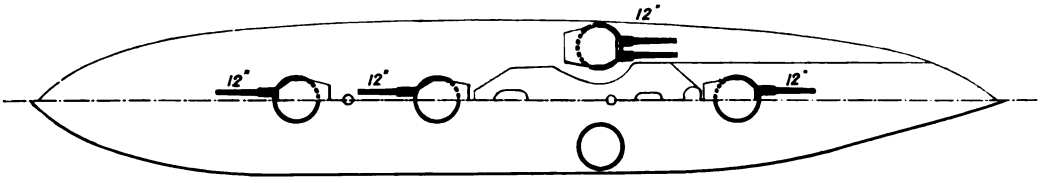
BATTLESHIPS.

"Dreadnought"

* { Bellerophon
  Temeraire
  Superb

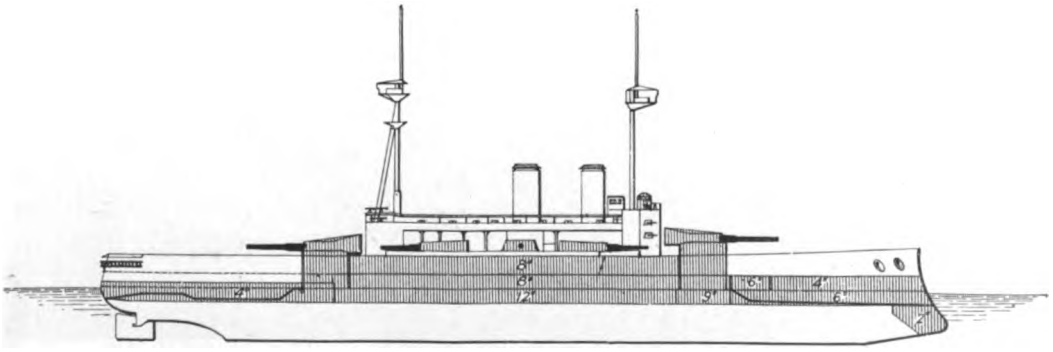


* *The foremost of the after turrets is raised to obtain astern fire. No mizzen mast.*



See page 174.

"Lord Nelson"
"Agamemnon"



See page 177.

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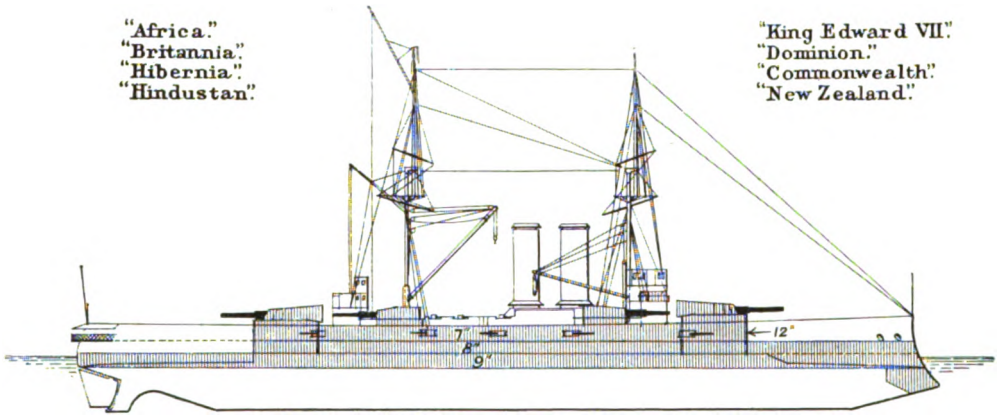
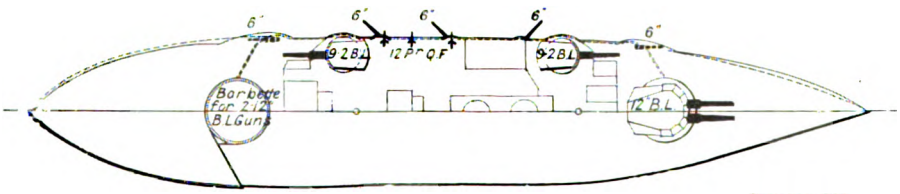
GREAT BRITAIN.

BATTLESHIPS.

"Africa."
"Britannia."
"Hibernia."
"Hindustan."

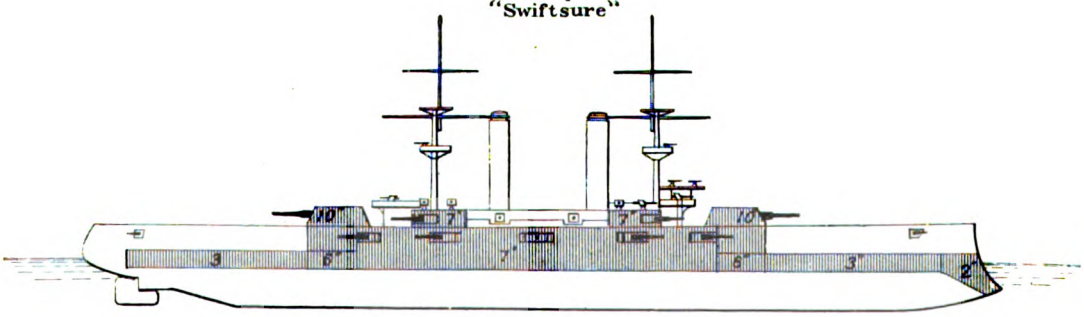
"King Edward VII."
"Dominion."
"Commonwealth."
"New Zealand."

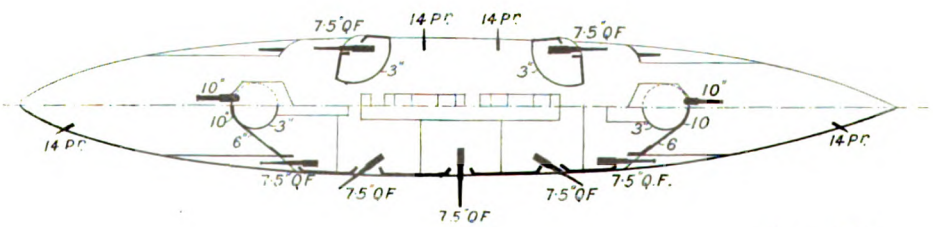




See page 172.

"Triumph"
"Swiftsure"





See page 179.

PLATE 2.

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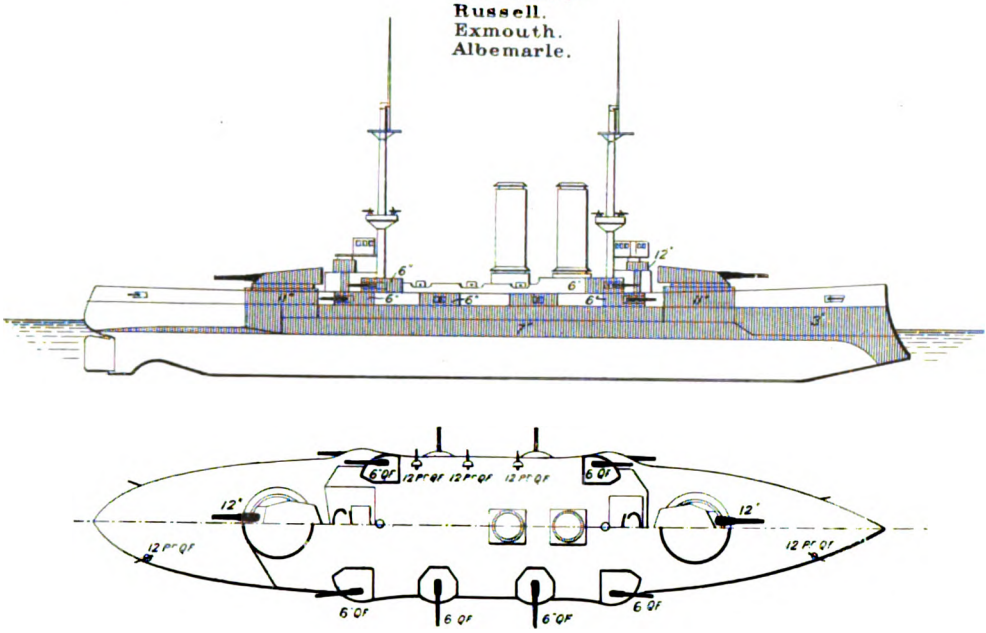
GREAT BRITAIN.

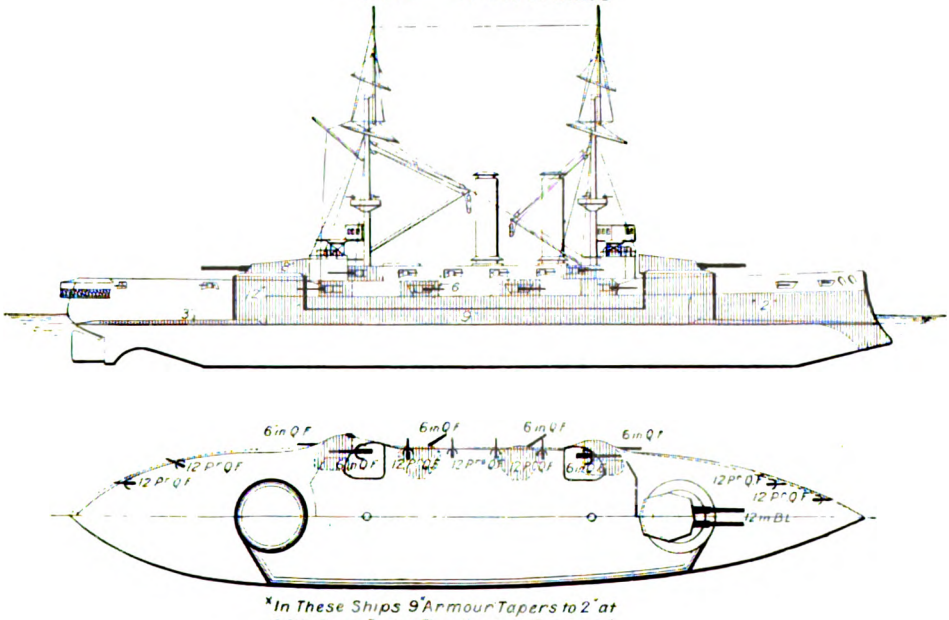
BATTLESHIPS.

Duncan.
Cornwallis.
Russell.
Exmouth.
Albemarle.



See page 174.

"Formidable", "Irresistible", "Implacable".
×"Bulwark", ×"London", ×"Venerable"
×"Queen" ×"Prince of Wales"



×In These Ships 9" Armour Tapers to 2" at 30 ft From Bow, & They Have no Forward Bulkhead

See page 175.

PLATE 3.

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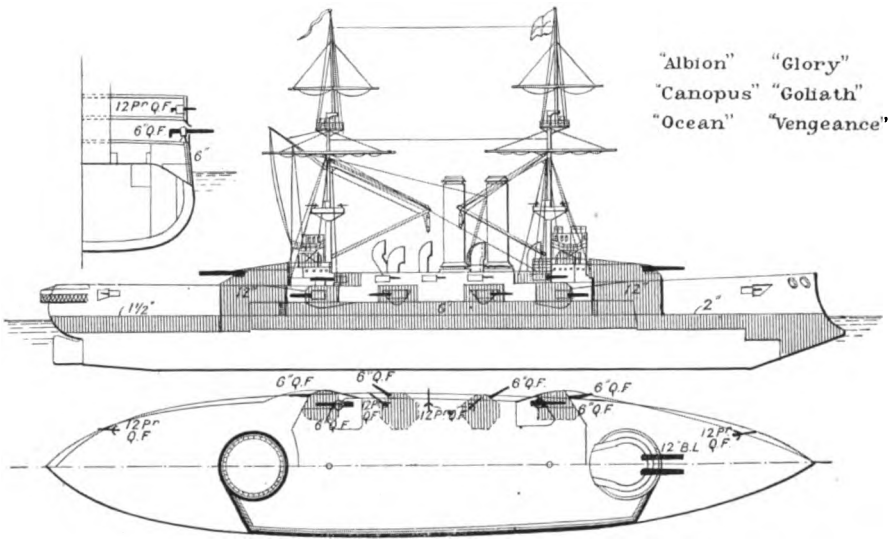
GREAT BRITAIN.

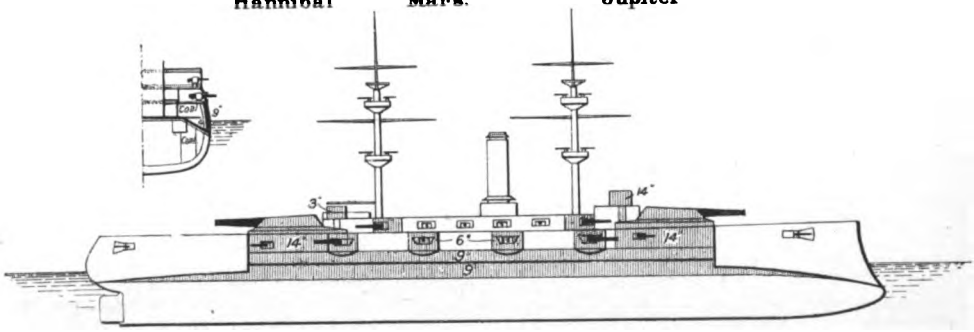
BATTLESHIPS.

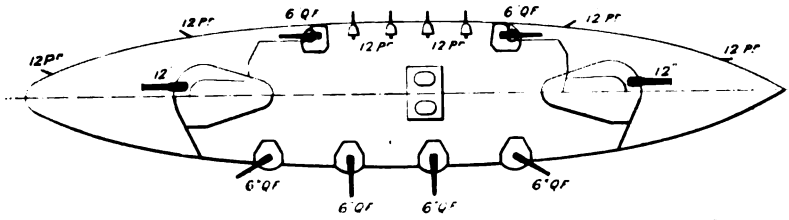


"Albion" "Glory"
"Canopus" "Goliath"
"Ocean" "Vengeance"

See page 172.

Majestic. **Prince George.** **Illustrious.**
Magnificent. **Victorious.** **Cæsar.**
Hannibal **Mars.** **Jupiter**





See page 177.

PLATE 4.

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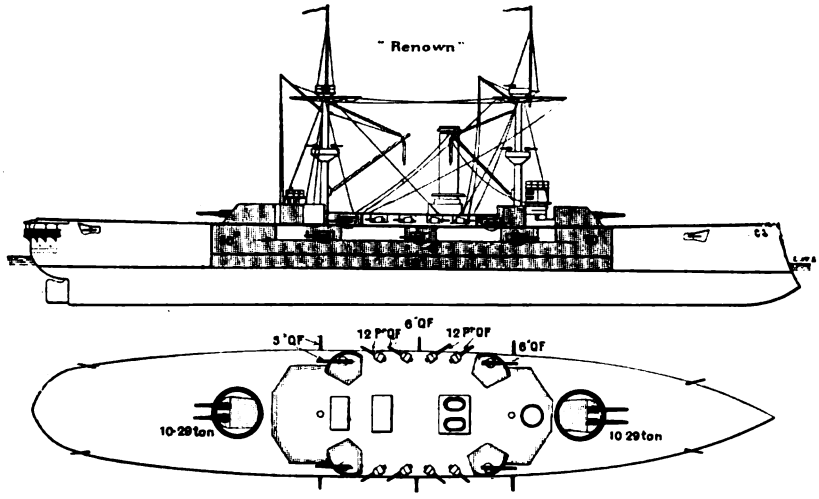
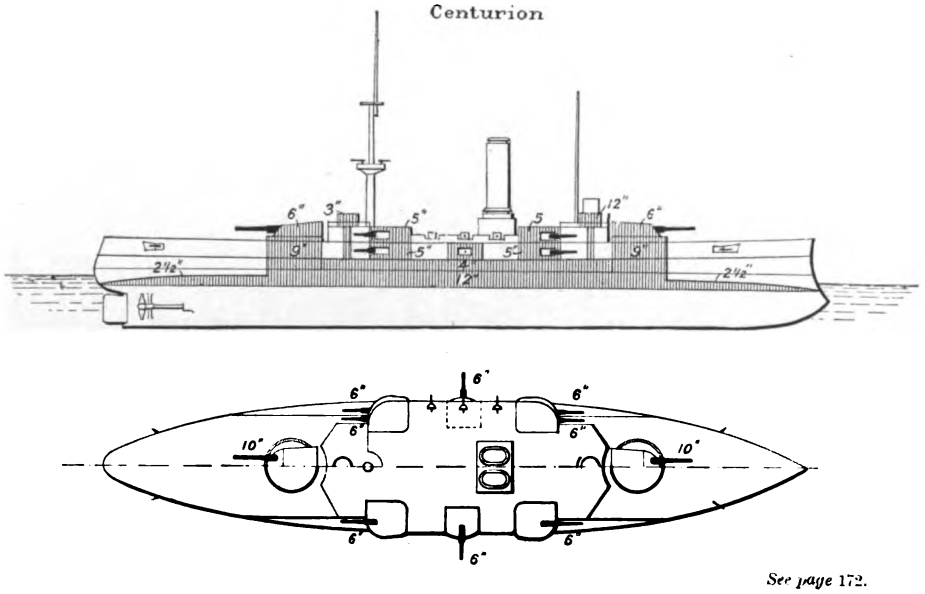
GREAT BRITAIN.

BATTLESHIPS.



See page 177.

Barfleur
Centurion



See page 172.

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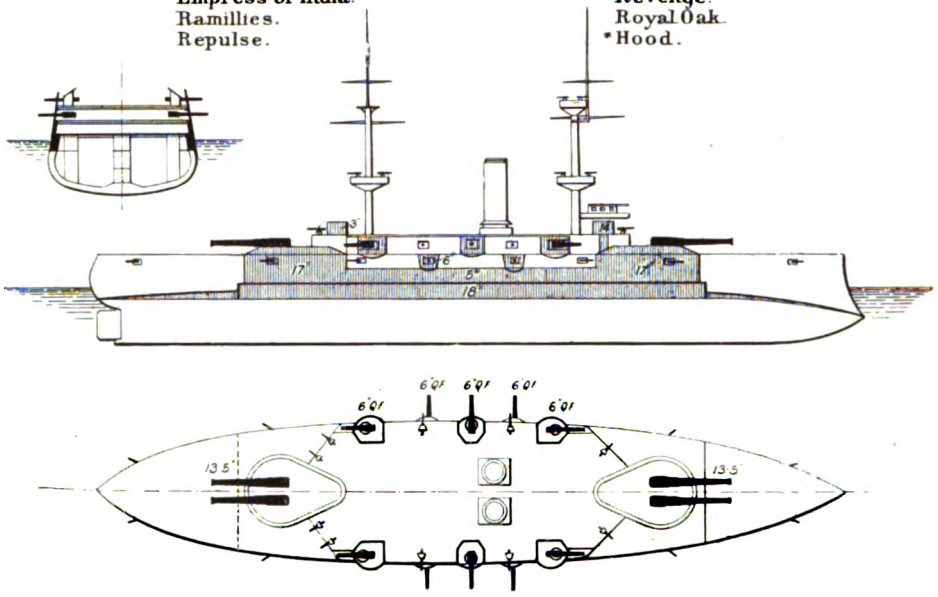
GREAT BRITAIN.

BATTLESHIPS.

Royal Sovereign.
Empress of India.
Ramillies.
Repulse.

Resolution.
Revenge.
Royal Oak.
*Hood.

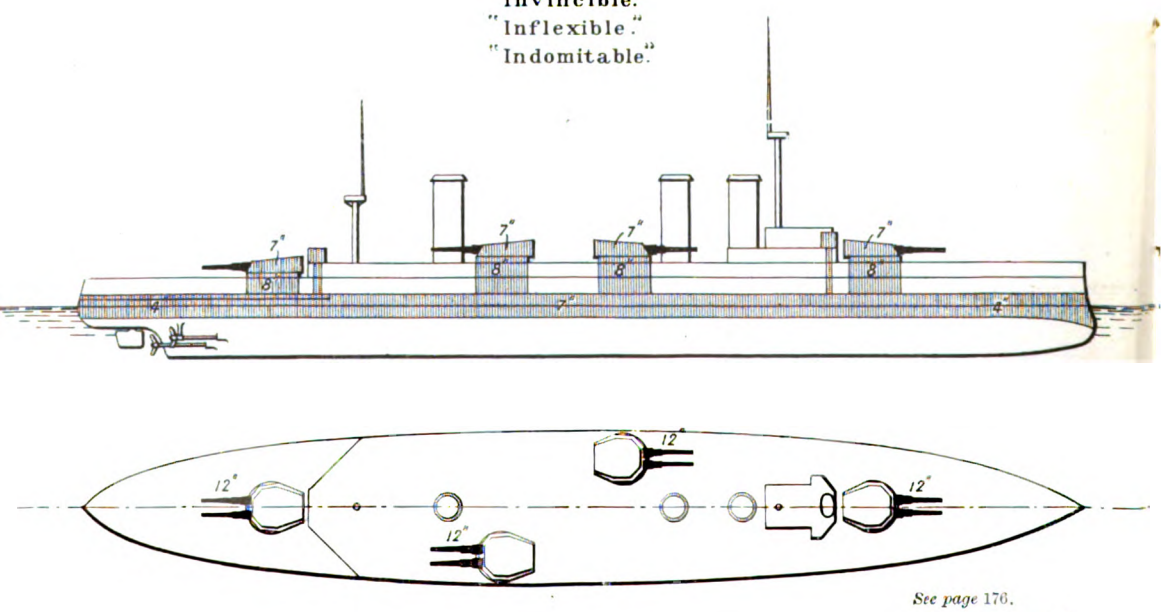


* The 13.5" guns are in turrets on the "Hood"

See page 173.

ARMOURED CRUISERS.

"Invincible."
"Inflexible."
"Indomitable."



See page 176.

PLATE 6.

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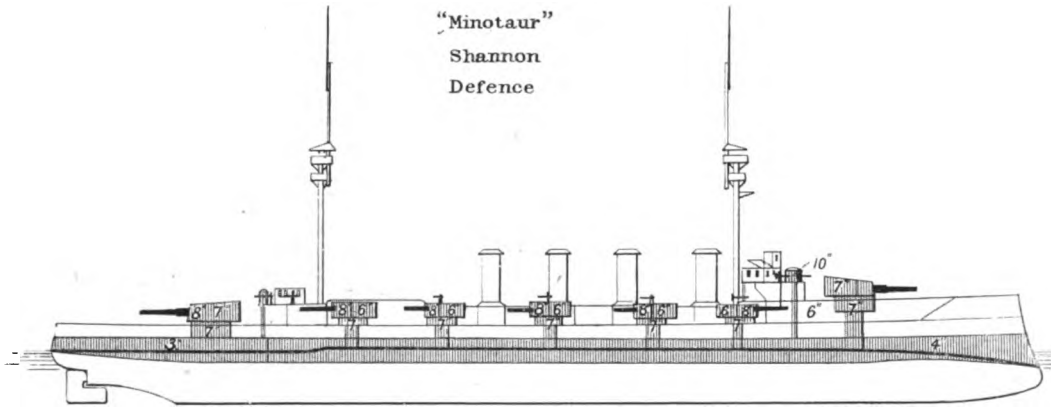
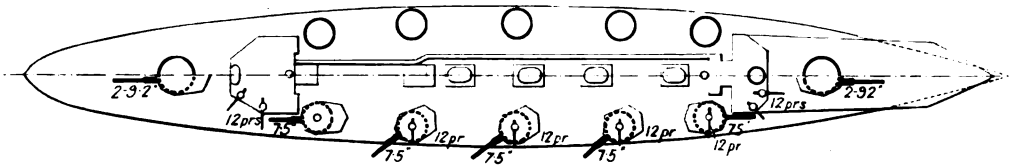
GREAT BRITAIN.

ARMOURED CRUISERS.

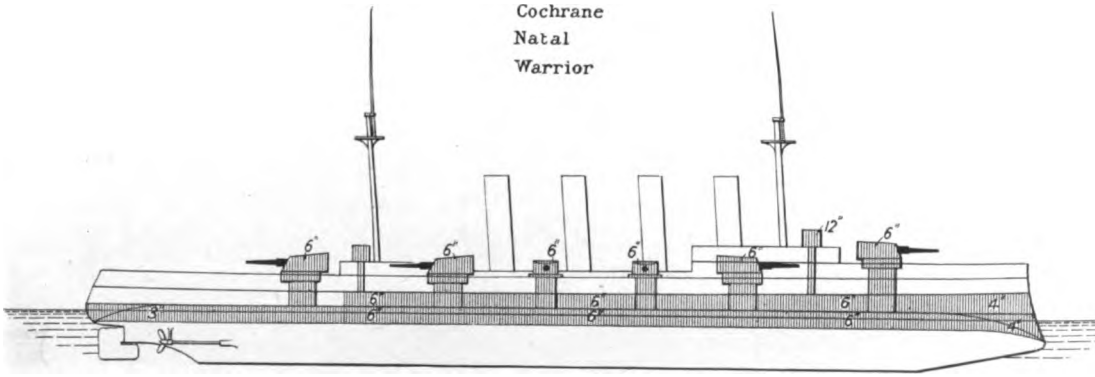
"Minotaur"
Shannon
Defence

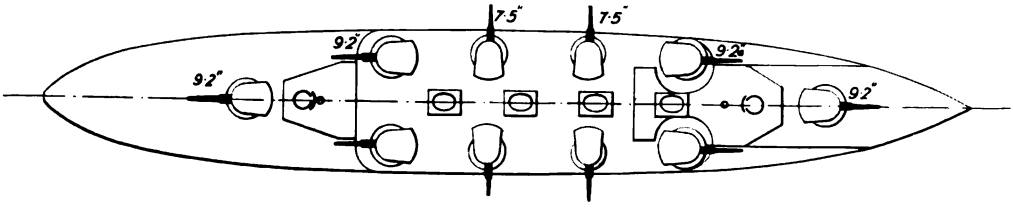




See page 177.

Achilles
Cochrane
Natal
Warrior





See page 172.

PLATE 7.

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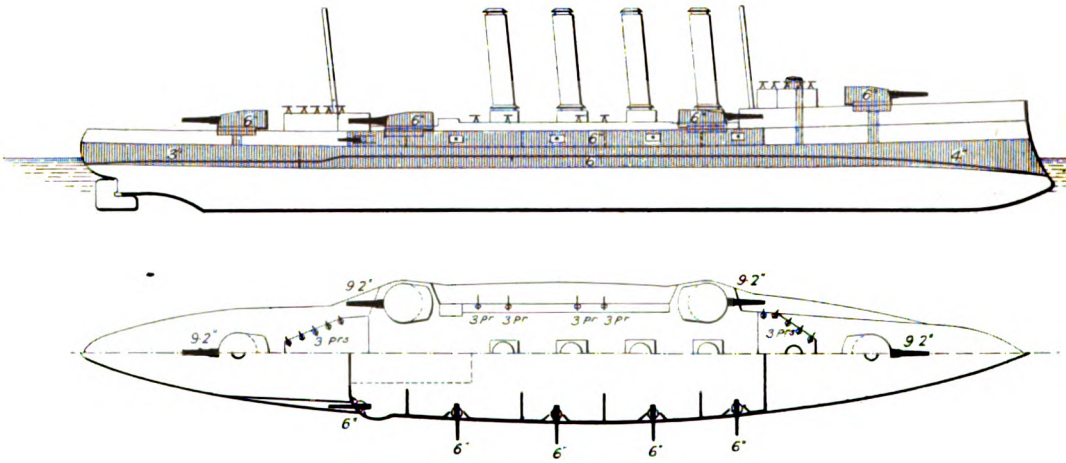
GREAT BRITAIN.

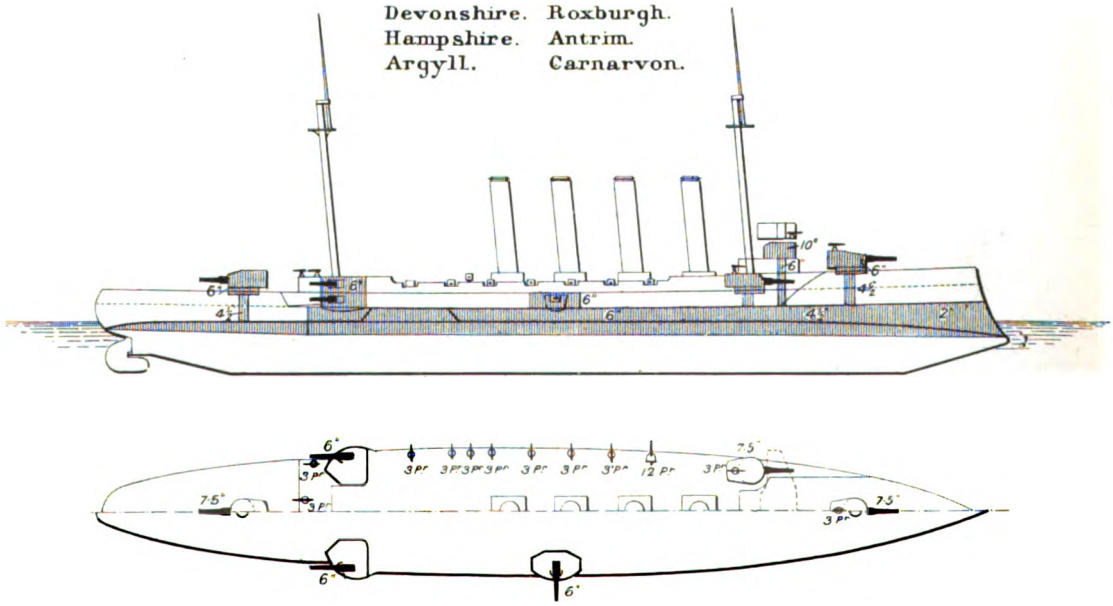
ARMOURED CRUISERS.

Duke of Edinburgh.
Black Prince.



See page 174.

Devonshire. **Roxburgh.**
Hampshire. **Antrim.**
Argyll. **Carnarvon.**



See page 174.

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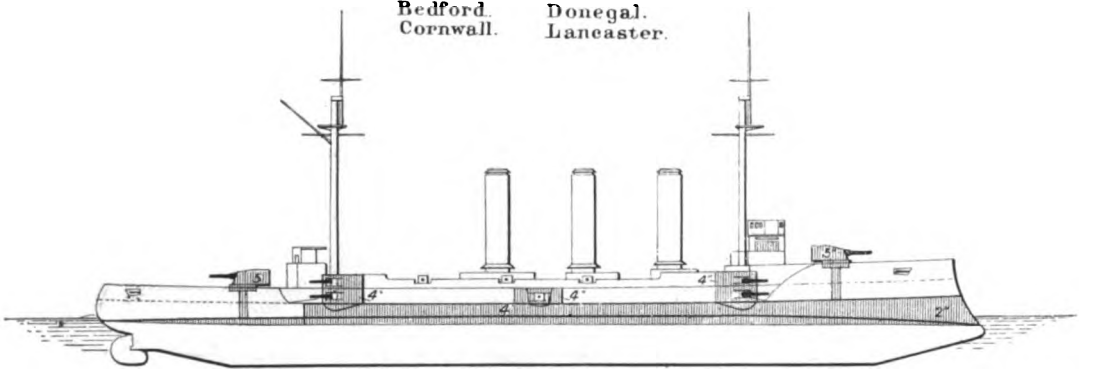
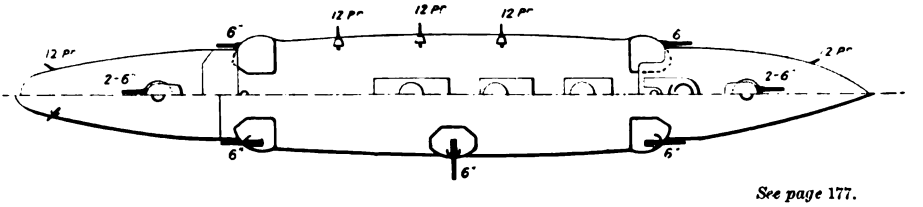
GREAT BRITAIN.

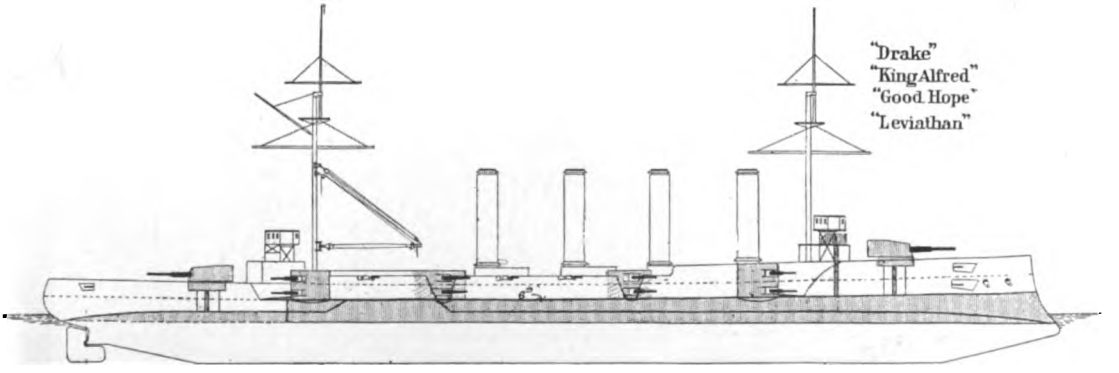
ARMOURED CRUISERS.

Monmouth. **Suffolk.**
Kent. **Berwick.**
Essex **Cumberland.**
Bedford. Donegal.
Cornwall. Lancaster.

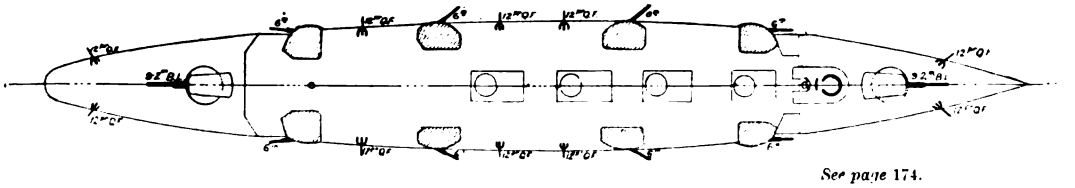




See page 177.



"Drake"
"King Alfred"
"Good Hope"
"Leviathan"



See page 174.

PLATE 9.

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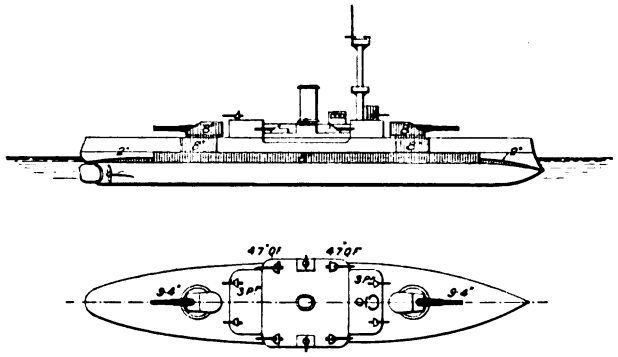
ARGENTINA.

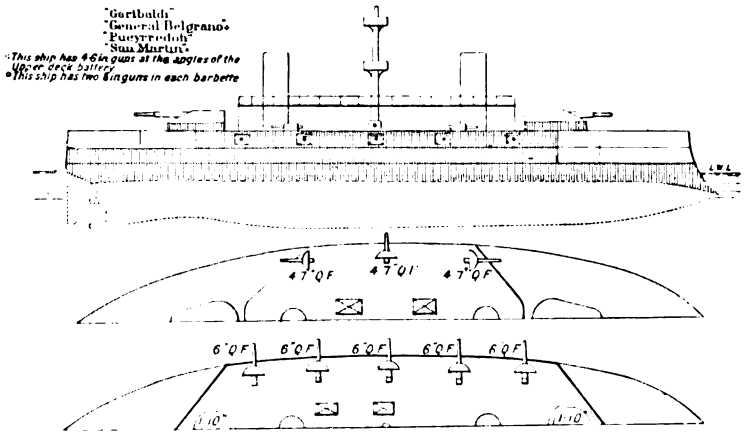
COAST DEFENCE SHIPS.

Libertad.
Independencia.



See page 188.

ARMOURED CRUISERS.



See page 188.

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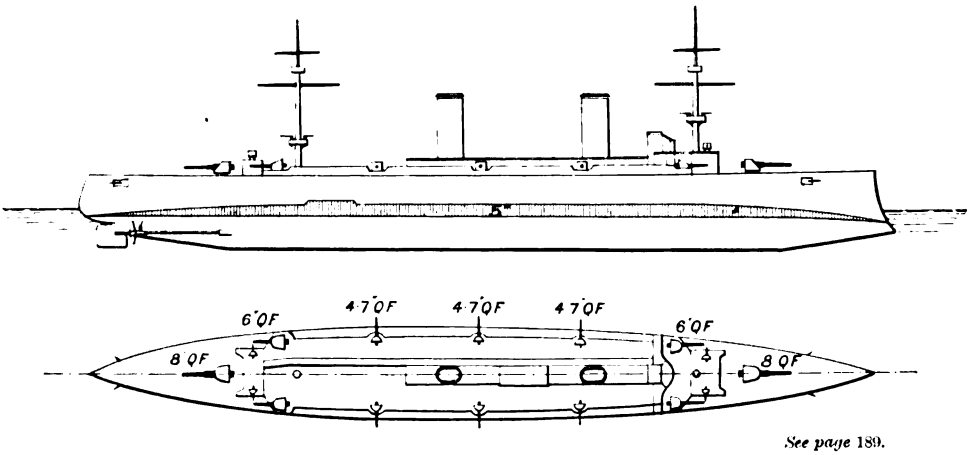
ARGENTINA

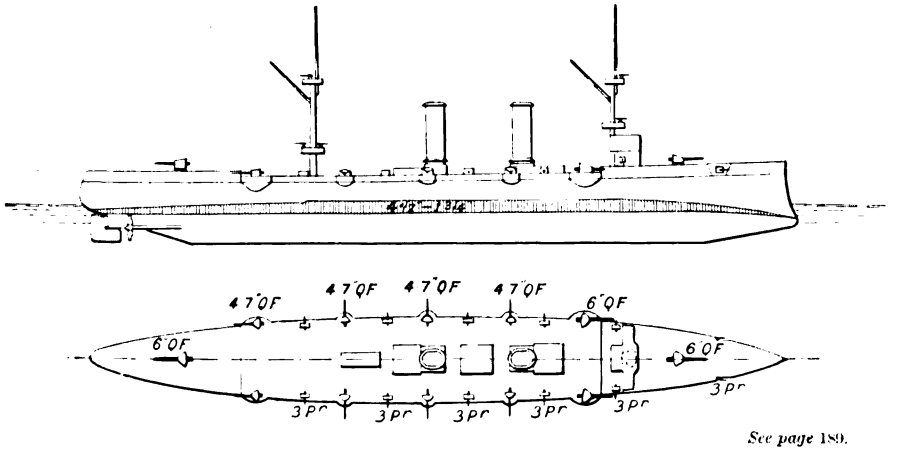
CRUISERS.

"Buenos Aires"



See page 189.

"Nueve de Julio"



See page 189.

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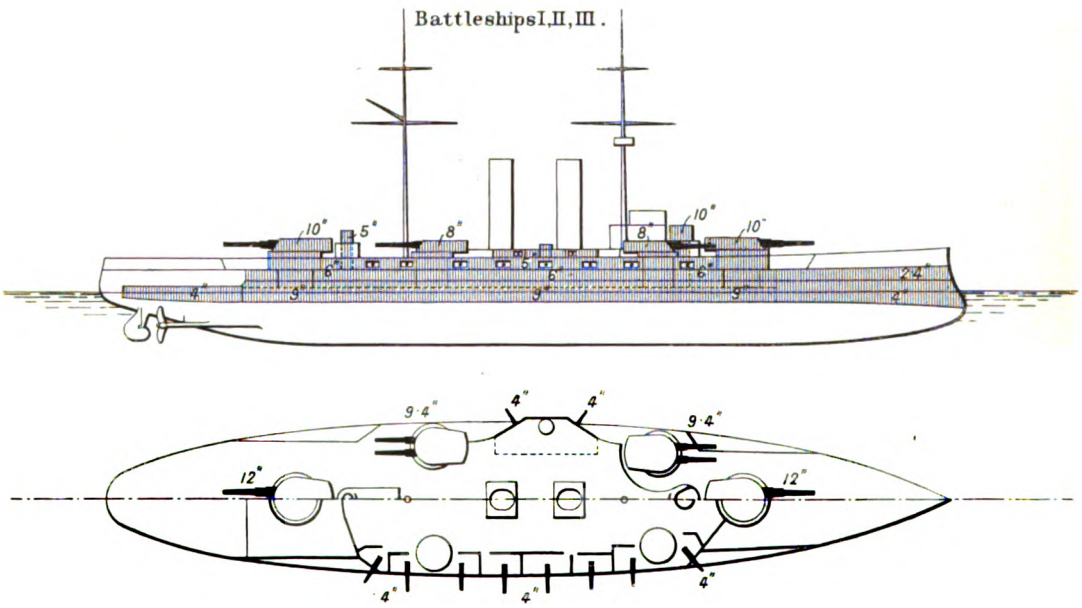
AUSTRIA.

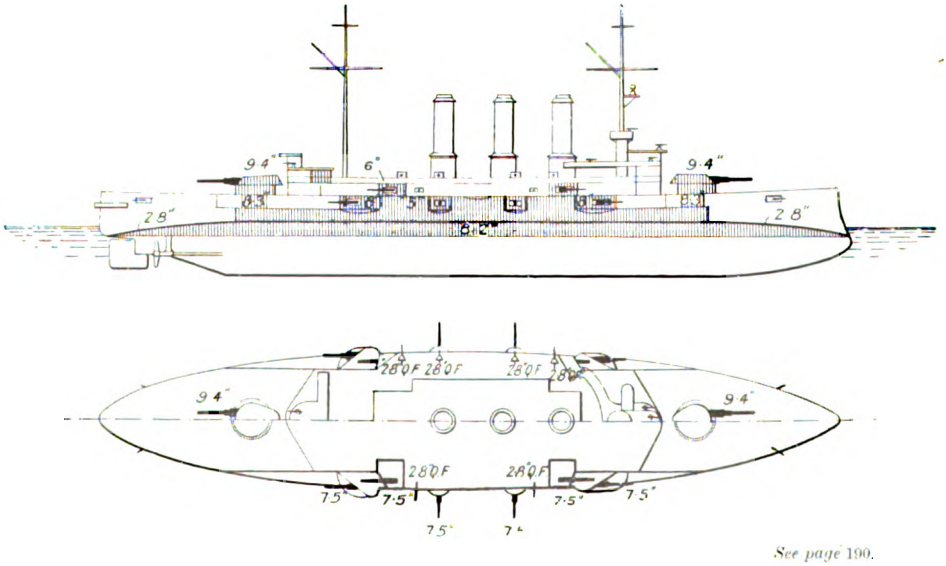
BATTLESHIPS.

Battleships I, II, III.



See page 190.

Erzherzog Karl
"Erzherzog Friedrich"



See page 190.

PLATE 14.

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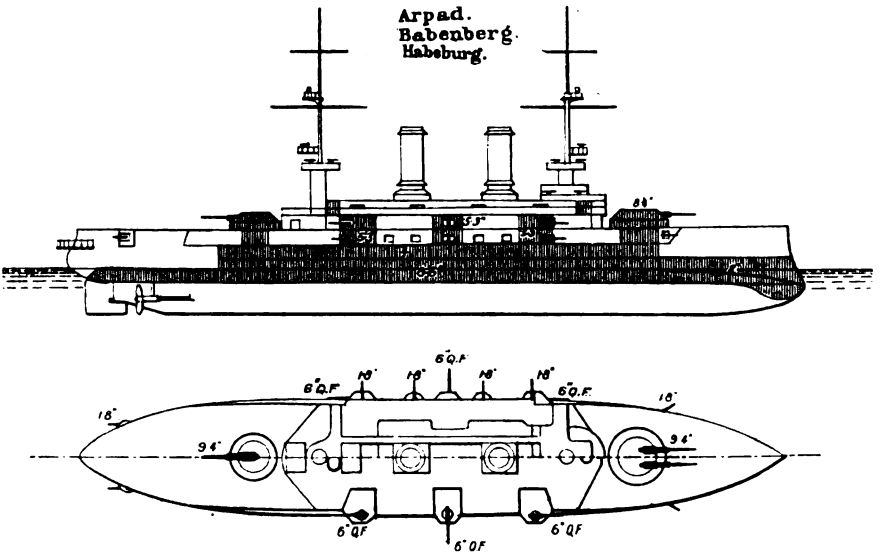
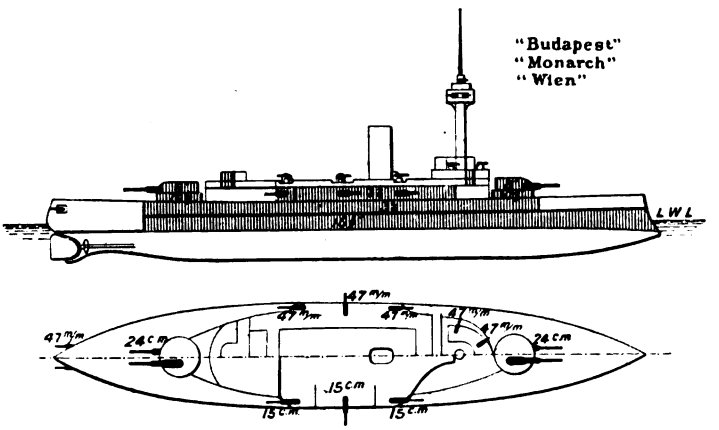
AUSTRIA.

BATTLESHIPS.



See page 190.



See page 190.

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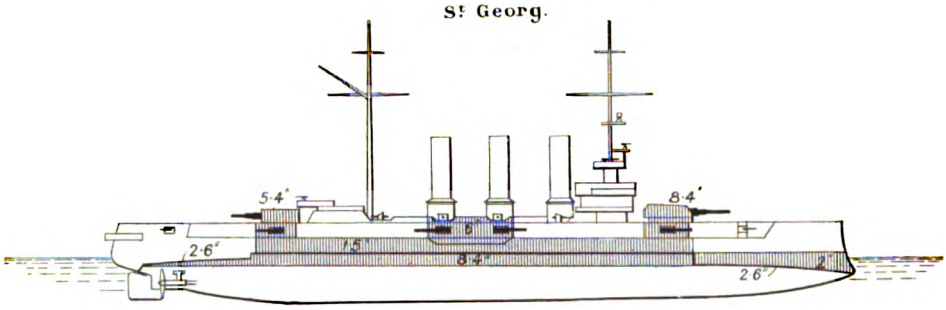
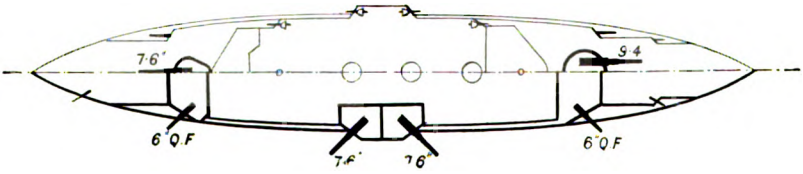
AUSTRIA.

ARMOURED CRUISERS.

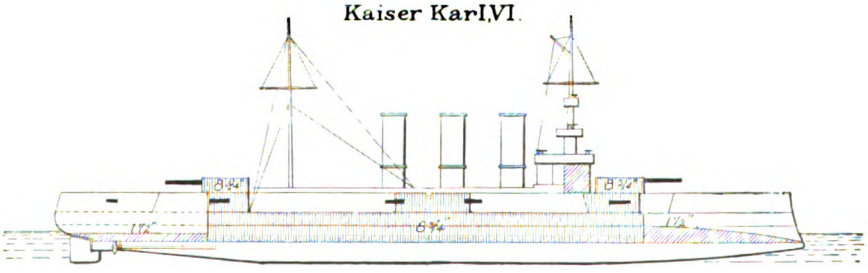
St Georg.

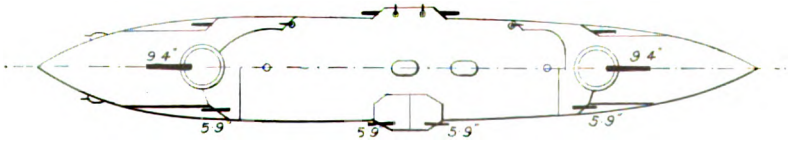




See page 190.

Kaiser Karl VI.





See page 190.

PLATE 16.

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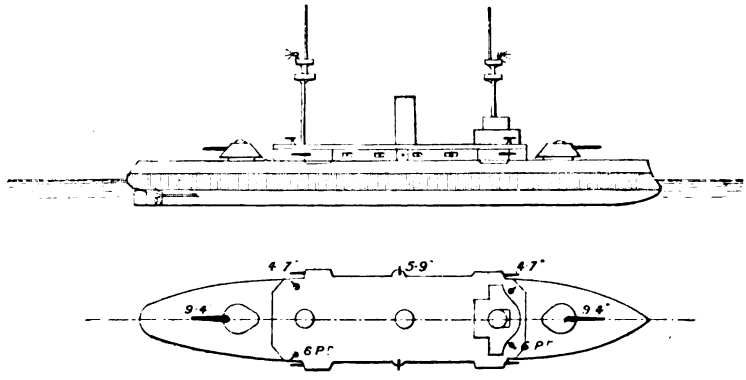
COAST DEFENCE SHIPS.

Marshal Deodoro
Marshal Floriano.



See page 192.

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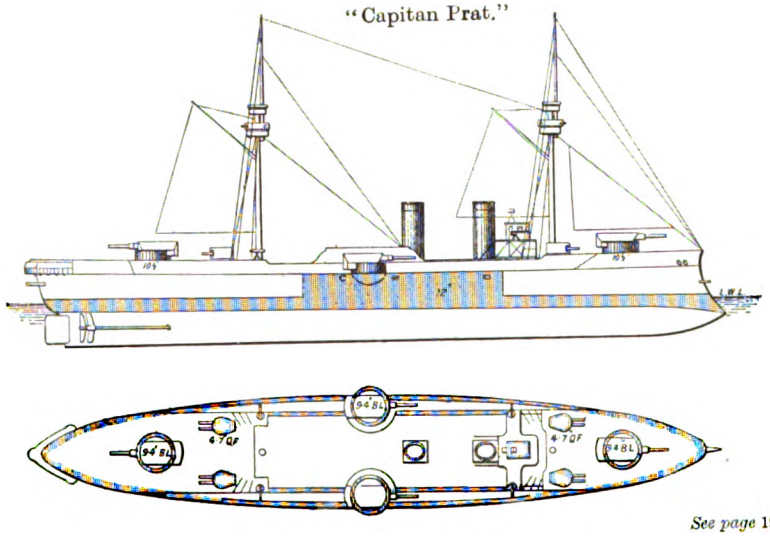
CHILI.

BATTLESHIP.

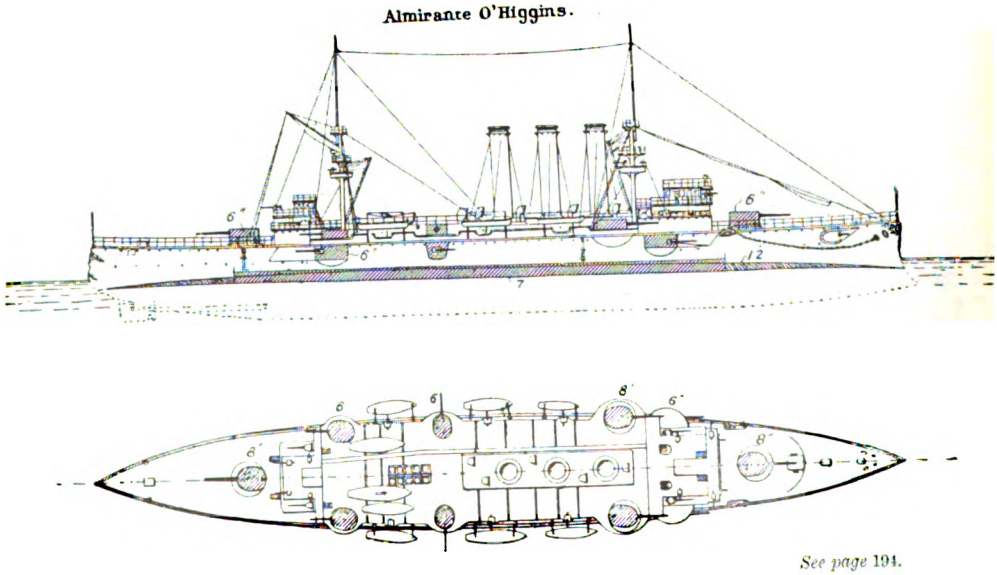
"Capitan Prat."



See page 194.

ARMOURED CRUISER.

Almirante O'Higgins.



See page 194.

PLATE 18.

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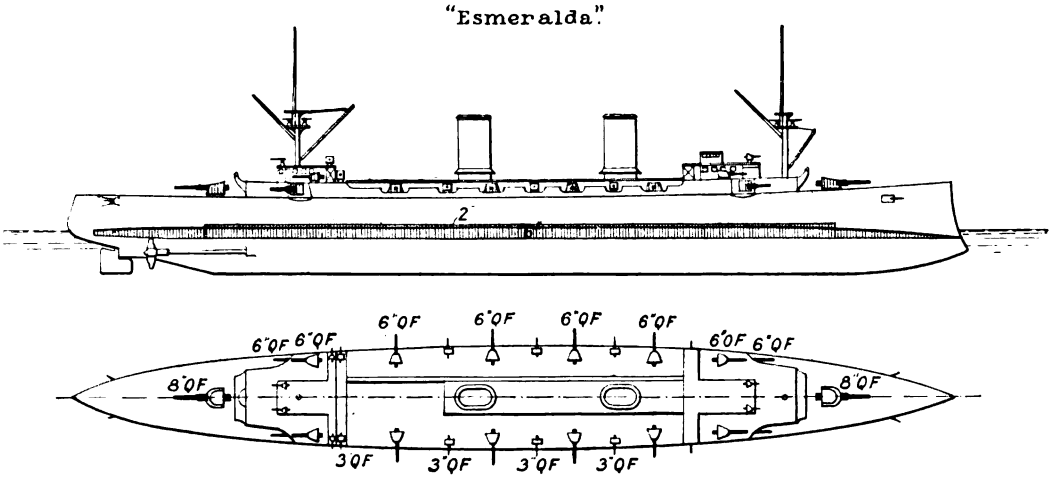
CHILI.

ARMOURED CRUISER.

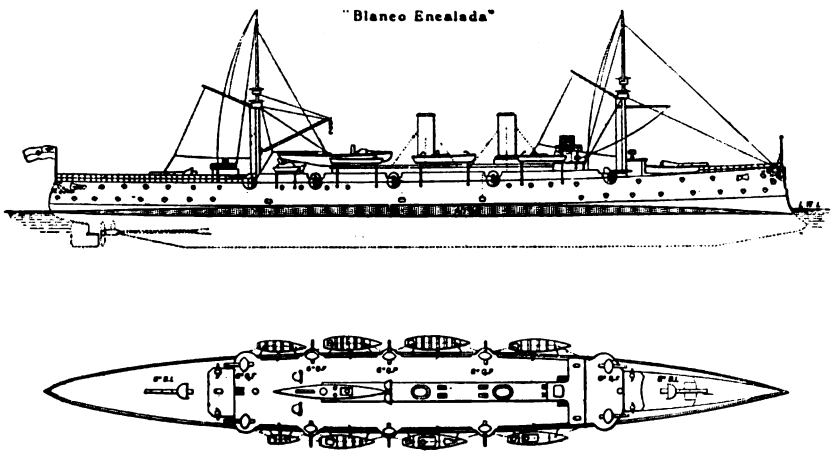
"Esmeralda."



See page 194.

CRUISER.

"Blanco Encalada"



See page 194.

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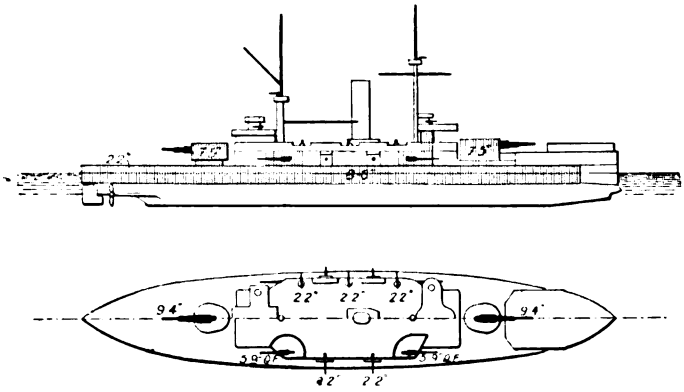
DENMARK.

COAST DEFENCE SHIPS.

Herluf Trolle.
Olfert Fischer.
Peder Schram.



See page 196.

PLATE 20.

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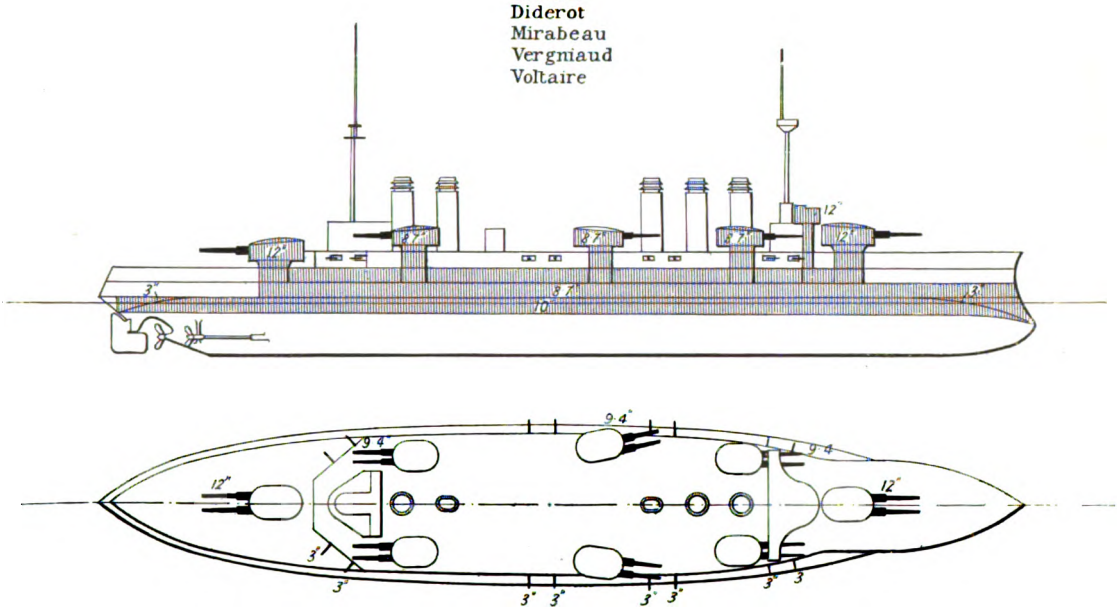
FRANCE.

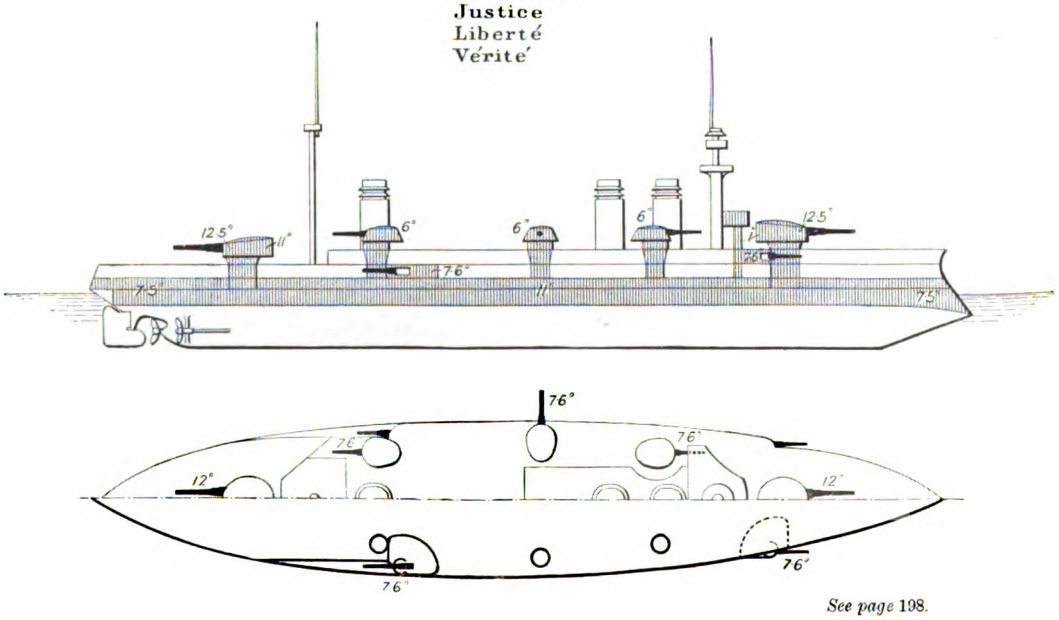
BATTLESHIPS.

Condorcet
Danton
Diderot
Mirabeau
Vergniaud
Voltaire



See page 198.

Démocratie
Justice
Liberté
Vérité



See page 198.

PLATE 21.

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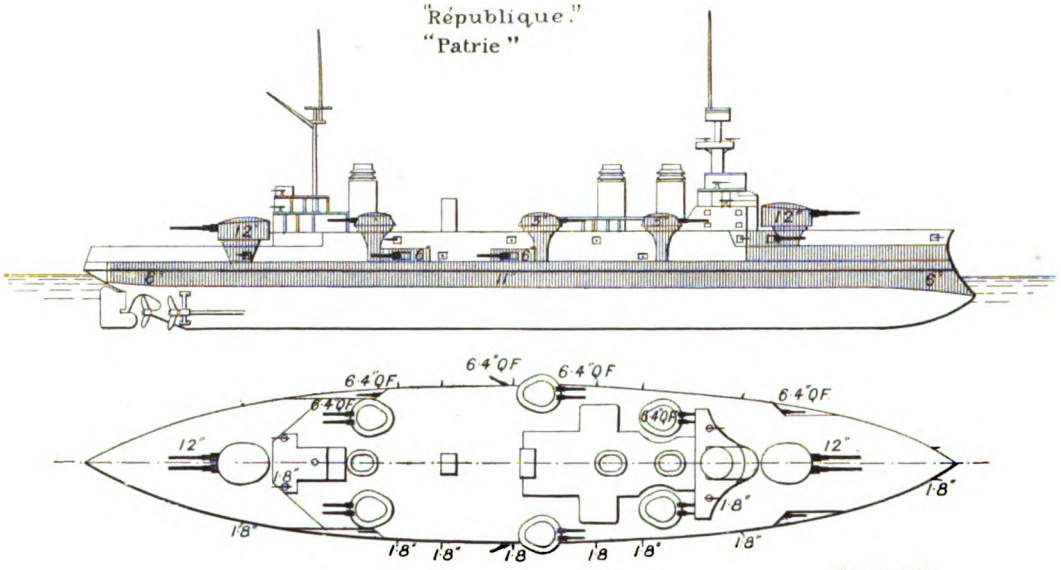
FRANCE.

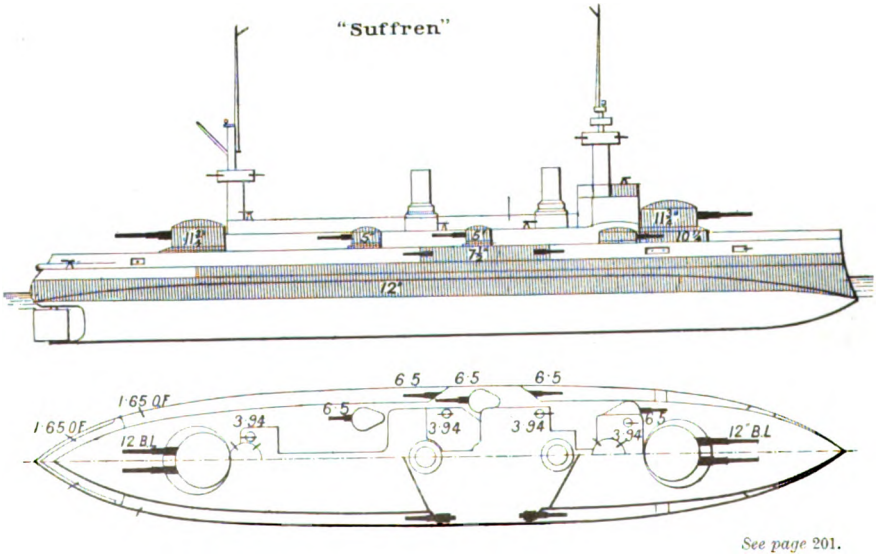
BATTLESHIPS.

"République."
"Patrie"



See page 200.

"Suffren"



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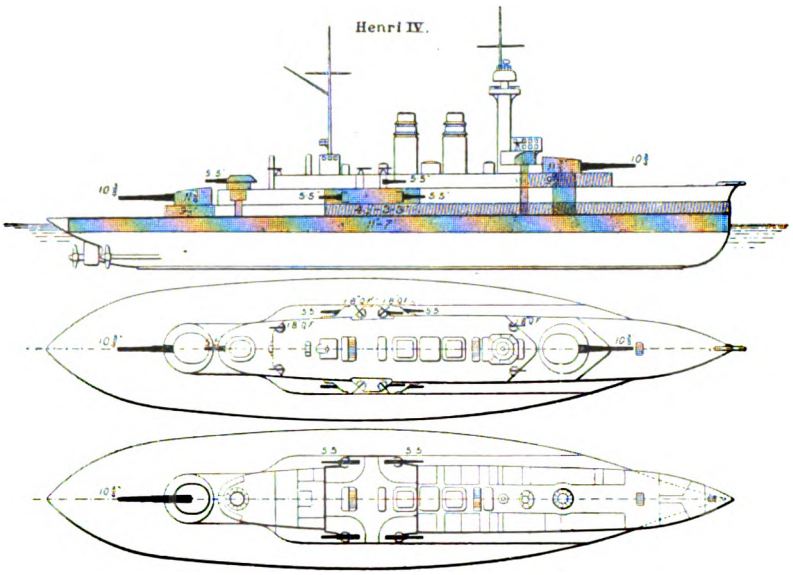
FRANCE

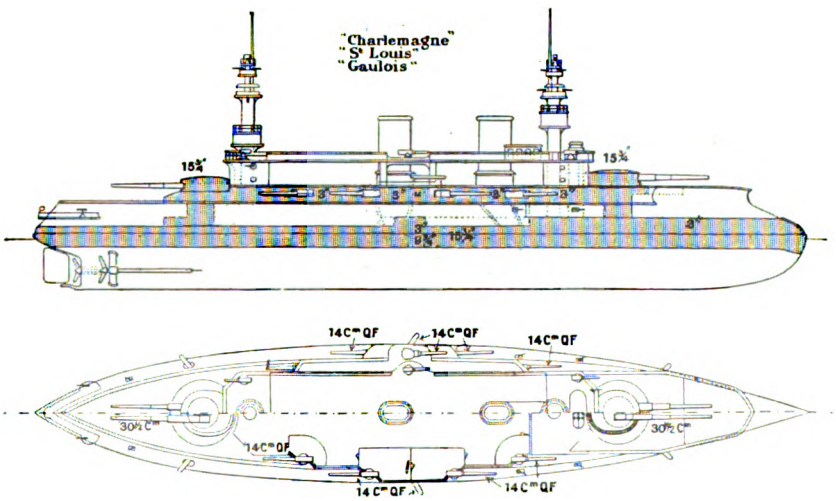
BATTLESHIPS.

Henri IV.



See page 199.

"Charlemagne"
"St Louis"
"Gaulois"



See page 197.

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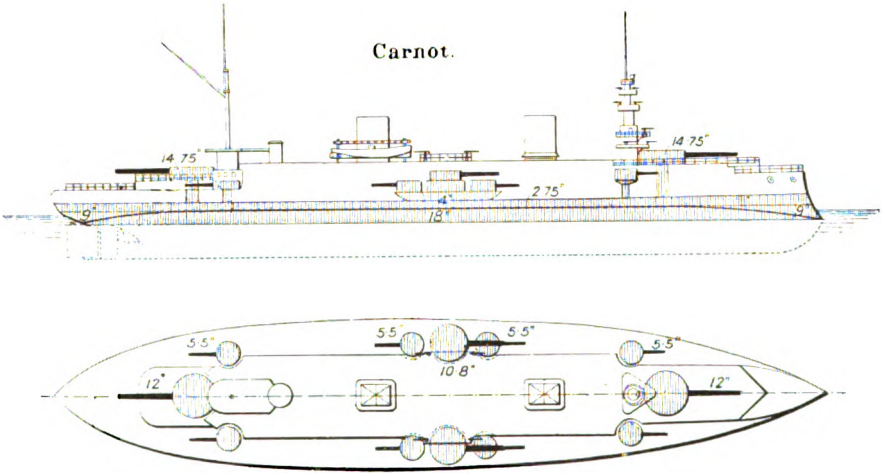
FRANCE.

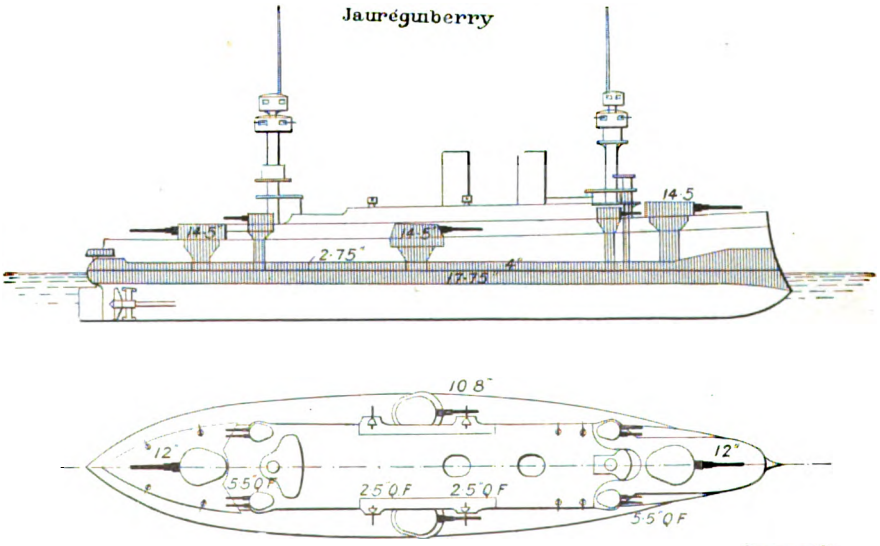
BATTLESHIPS.

Carnot.



See page 197.

Jaurégunberry



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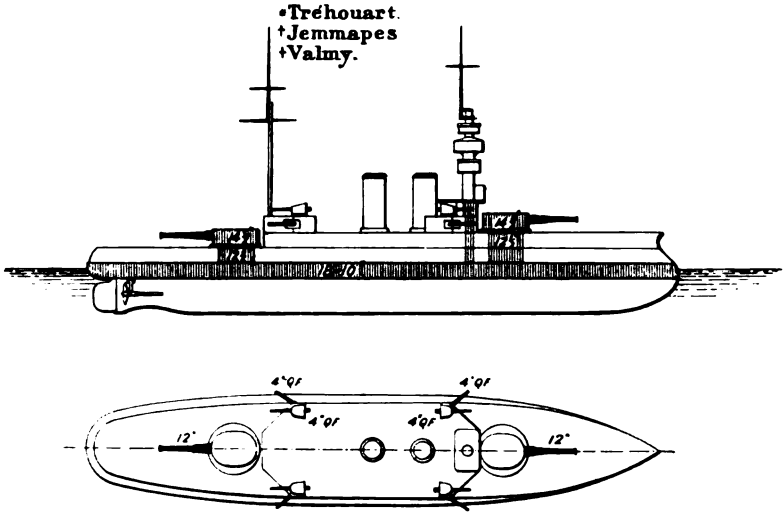
FRANCE.

BATTLESHIPS.

Bouvines
***Tréhouart.**
†Jemmapes
†Valmy.

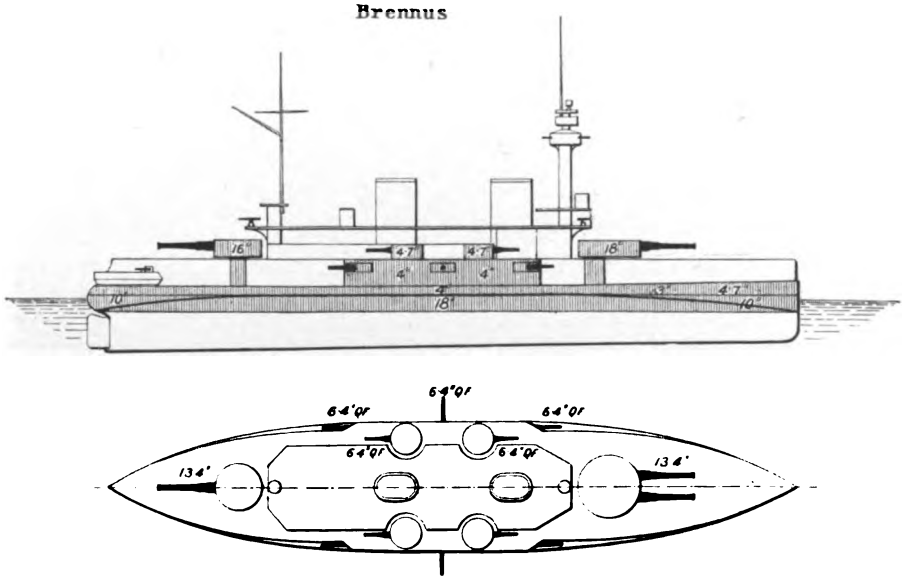


* The "Tréhouart" has but one funnel.

† These ships have 13·4" guns in the turret and only 4·4" guns. The forward 13·4" gun is mounted on the same deck as the after one.

See page 197.

Brennus



See page 197.

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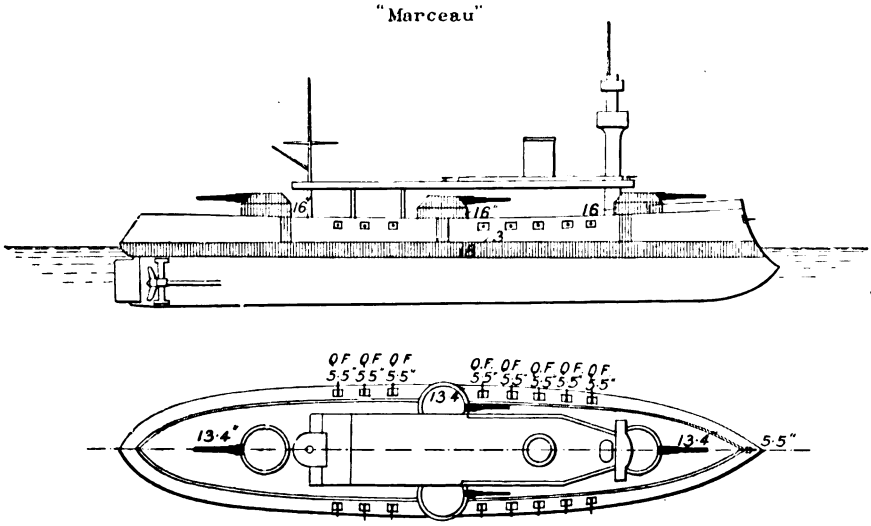
FRANCE.

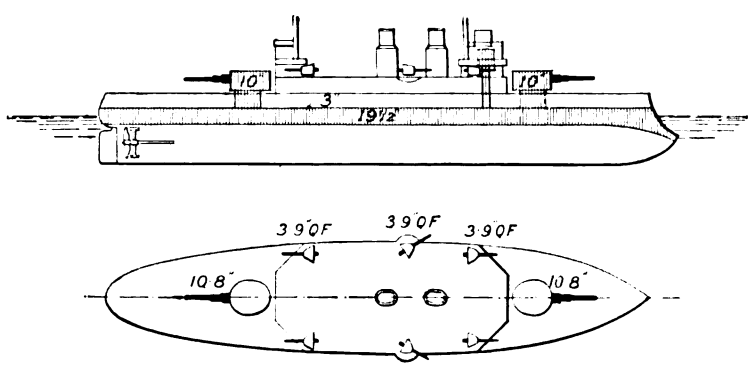
BATTLESHIPS.

"Marceau"



See page 200.

"Caiman"
"Indomptable"
"Requin"
"Terrible"



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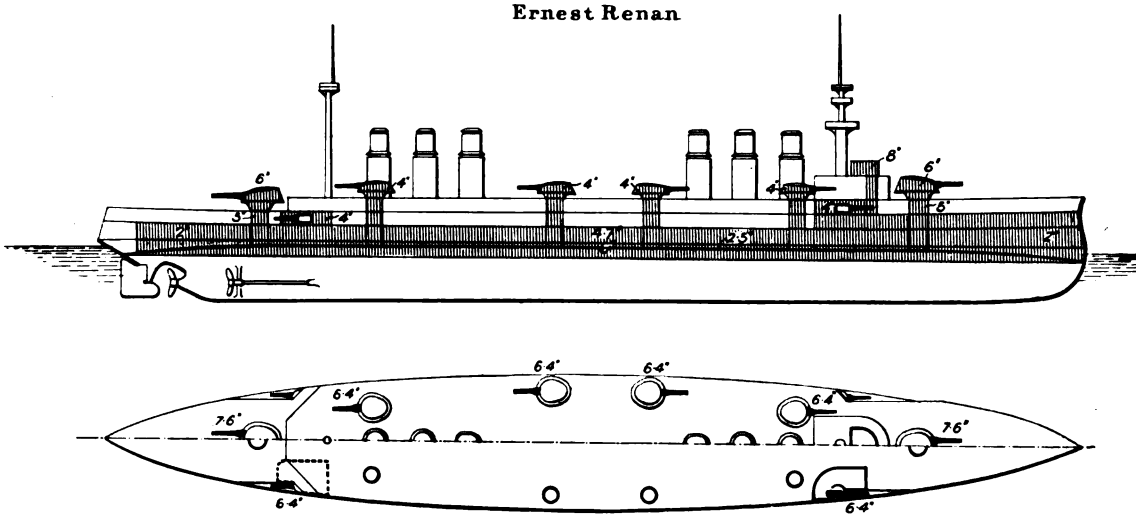
FRANCE.

ARMOURED CRUISERS.

Ernest Renan



See page 198.

Jules Ferry.
Léon Gambetta.
Victor Hugo.

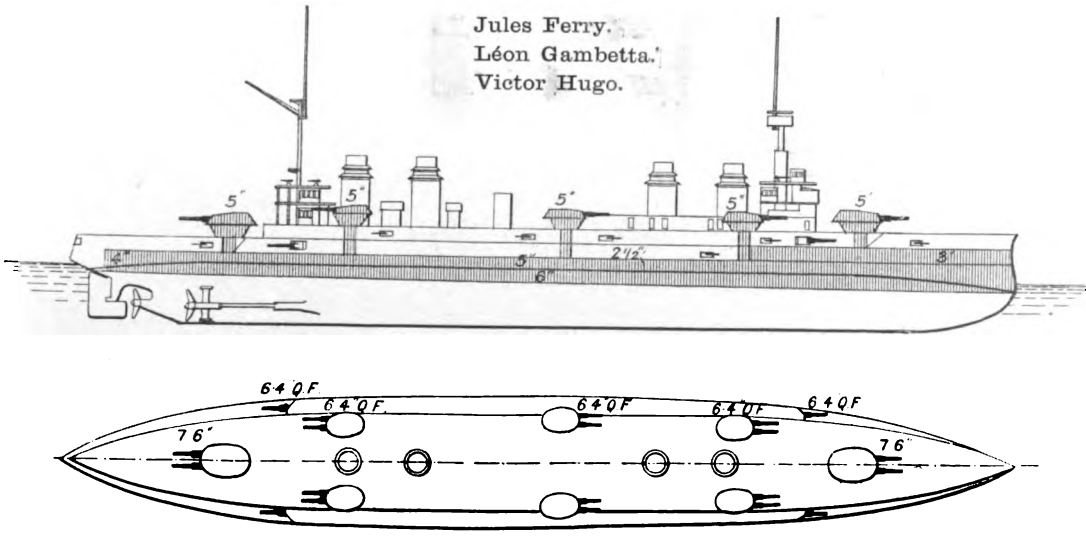


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PLATE 27.

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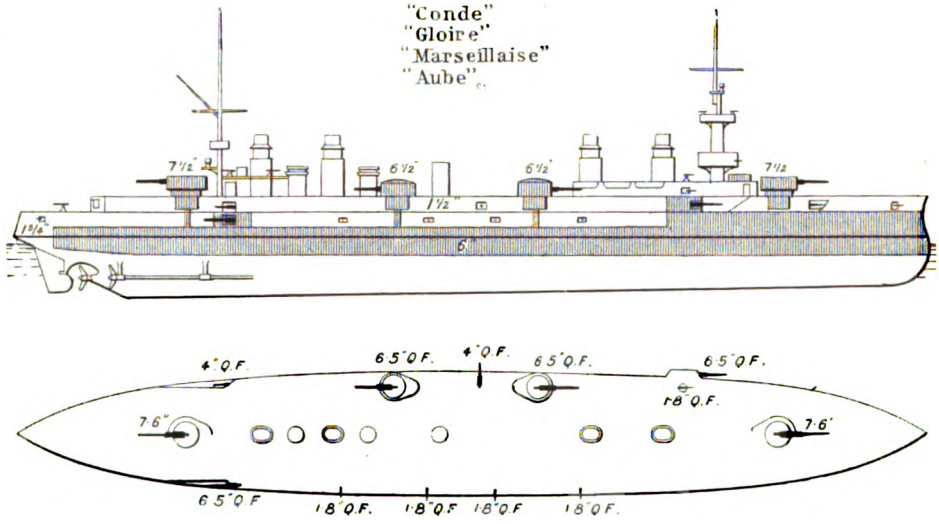
FRANCE.

ARMOURED CRUISERS.

"Conde"
"Gloire"
"Marseillaise"
"Aube".



See page 198.

Desaix.
Kléber.
Dupleix.

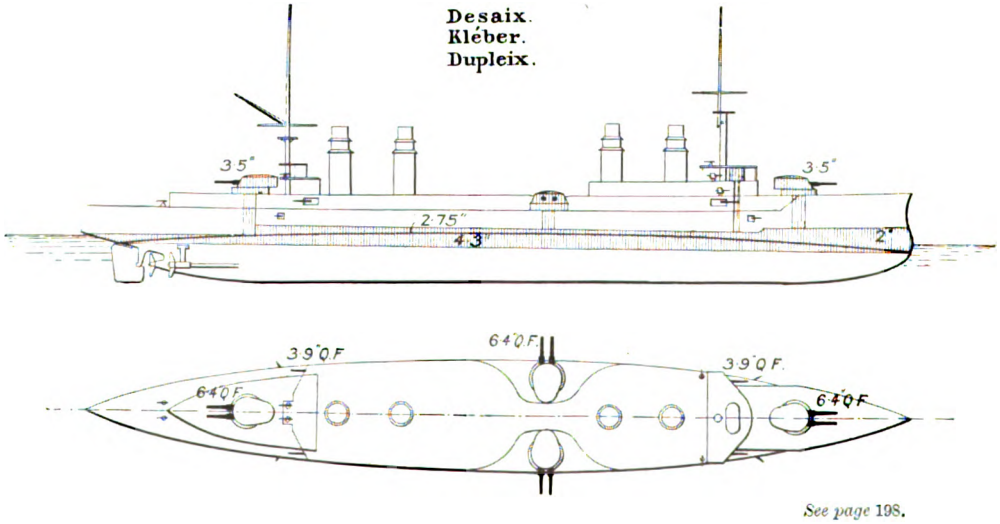


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PLATE 28.

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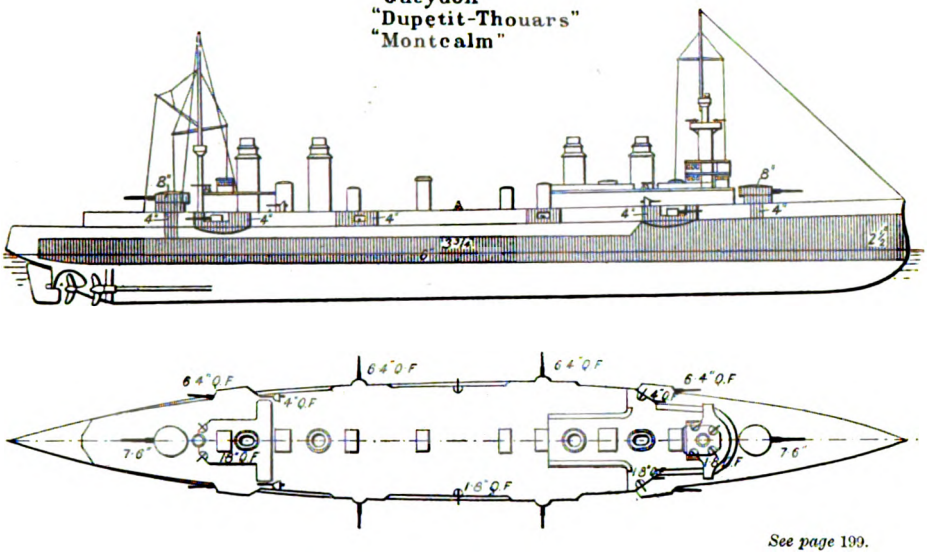
FRANCE.

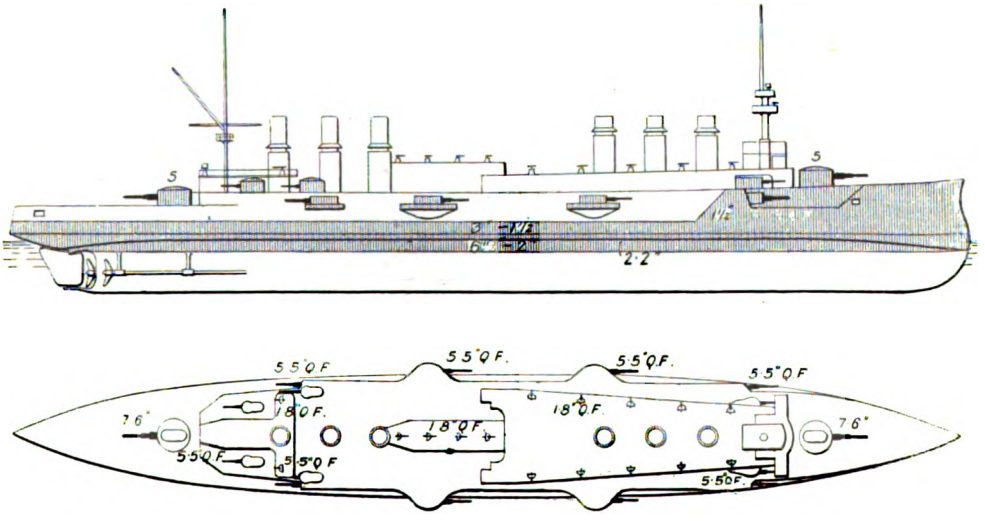
ARMOURED CRUISERS.

"Gueydon"
"Dupetit-Thouars"
"Montcalm"



See page 199.

"Jeanne d'Arc"



See page 199.

PLATE 29.

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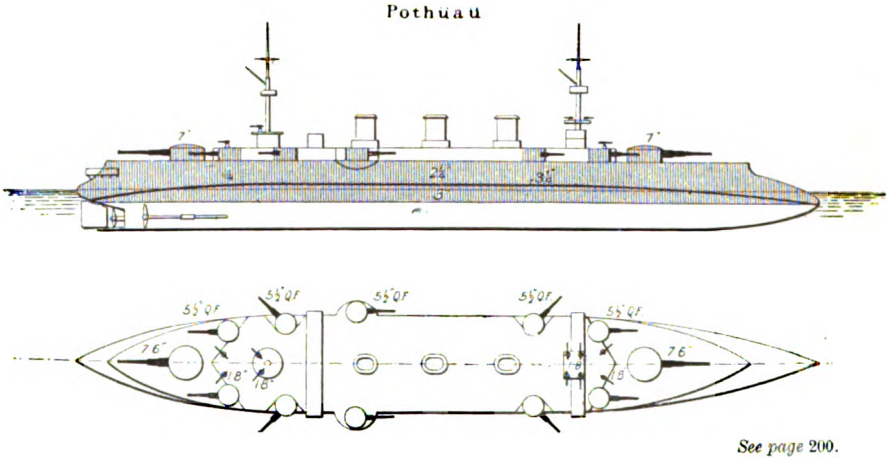
FRANCE.

ARMOURED CRUISER.

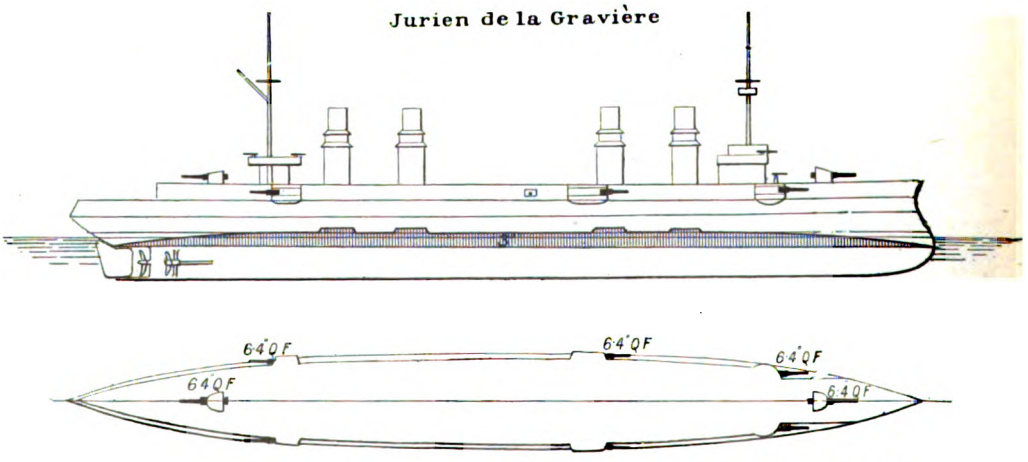
Pothuau



See page 200.

CRUISER.

Jurien de la Gravière



See page 203.

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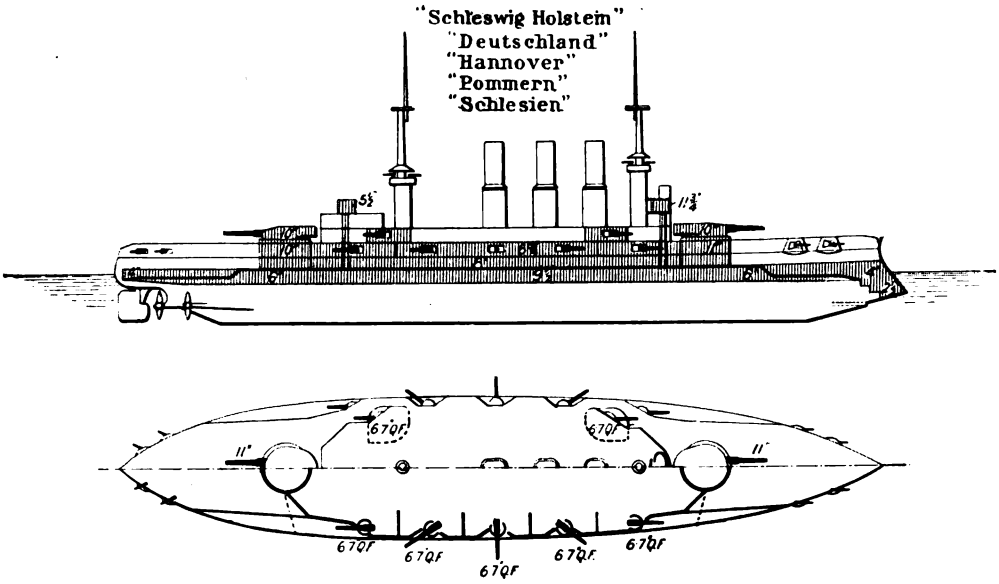
GERMANY.

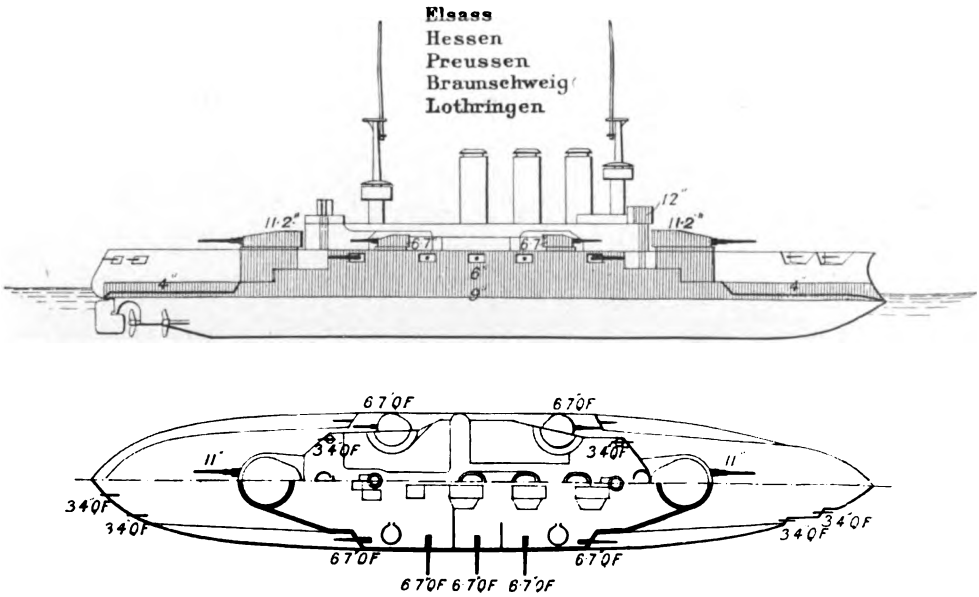
BATTLESHIPS.

"Schleswig Holstein"
"Deutschland"
"Hannover"
"Pommern"
"Schlesien"



See page 207.

Elsass
Hessen
Preussen
Braunschweig
Lothringen



See page 205.

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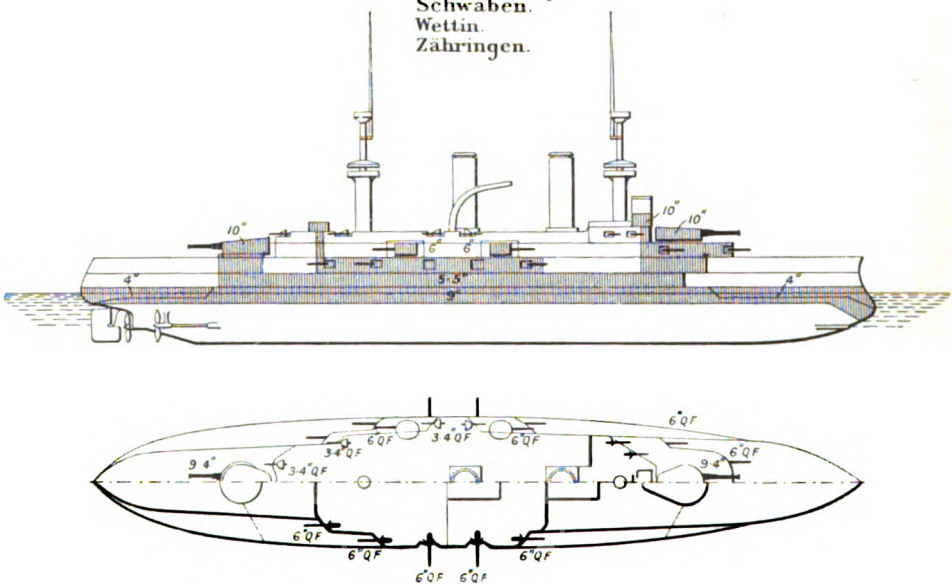
GERMANY.

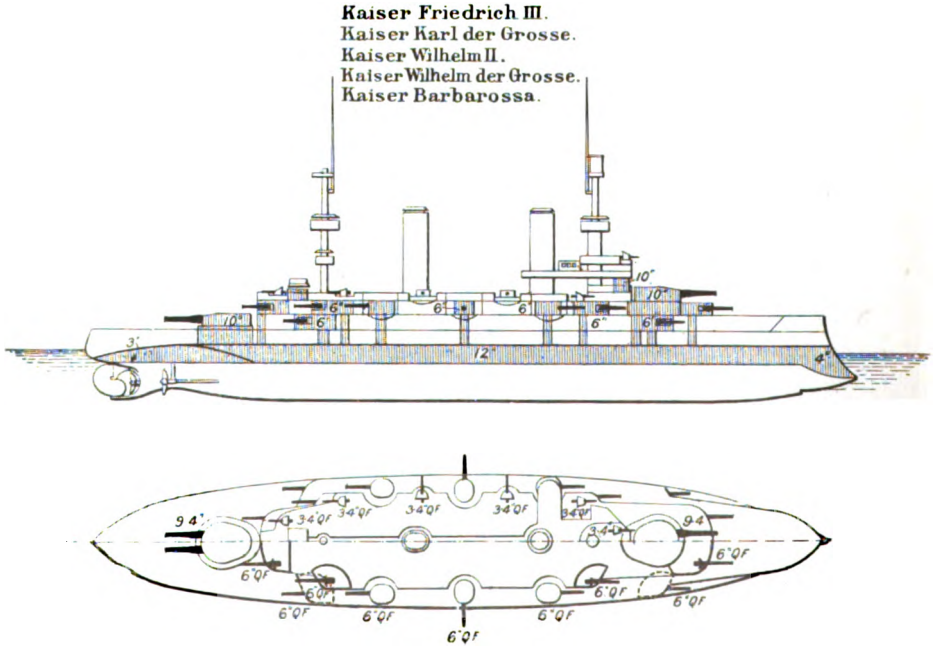
BATTLESHIPS.

Wittelsbach.
Mecklenburg.
Schwaben.
Wettin.
Zähringen.



See page 207.

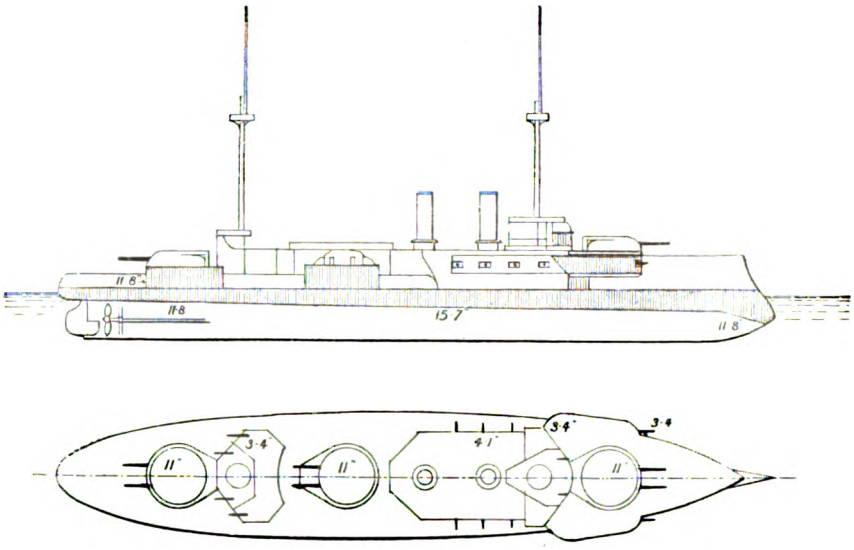
Kaiser Friedrich III.
Kaiser Karl der Grosse.
Kaiser Wilhelm II.
Kaiser Wilhelm der Grosse.
Kaiser Barbarossa.


10"
6"
6"
6"
6"
6"
10"
10"
3"
12"
4"
9·4"
3·4"QF
6"QF
6"QF
6"QF
6"QF
6"QF
6"QF
6

GERMANY.

BATTLESHIPS.

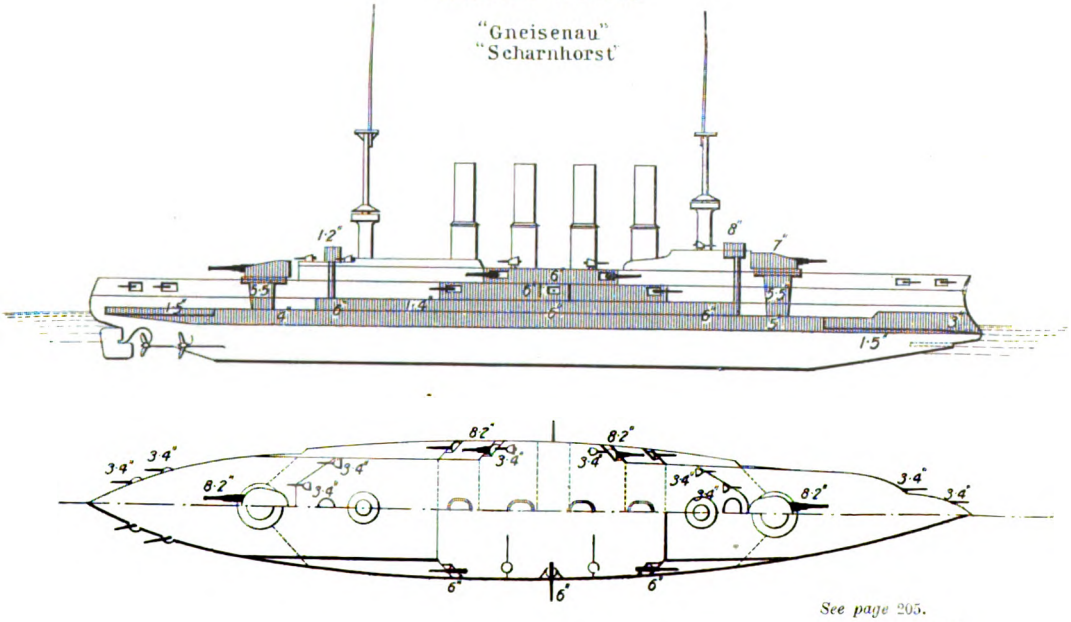
Kürfurst Friedrich Wilhelm
Brandenburg.
Weissenburg.
Wörth



See page 206.

ARMOURED CRUISERS.

"Gneisenau"
"Scharnhorst"



See page 205.

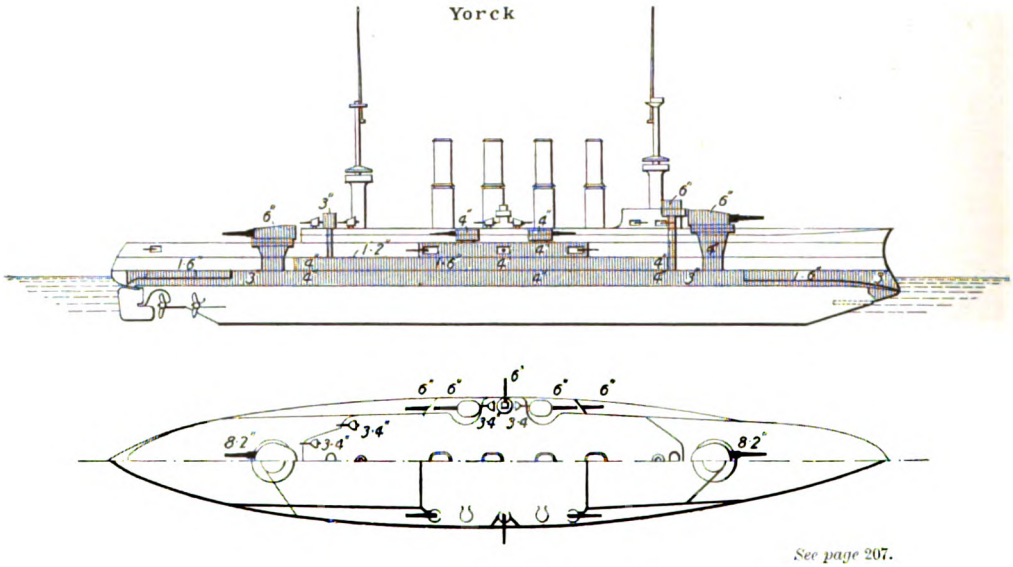
PLATE 33.

Digitized by Google

GERMANY.

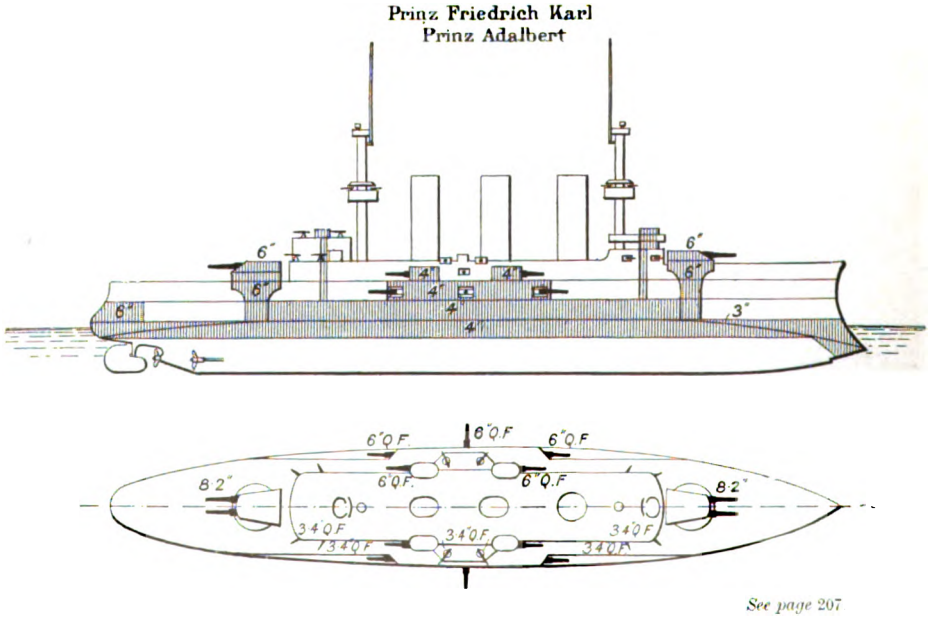
ARMOURED CRUISERS.

Roon
Yorck



See page 207.

Prinz Friedrich Karl
Prinz Adalbert



See page 207

PLATE 34.

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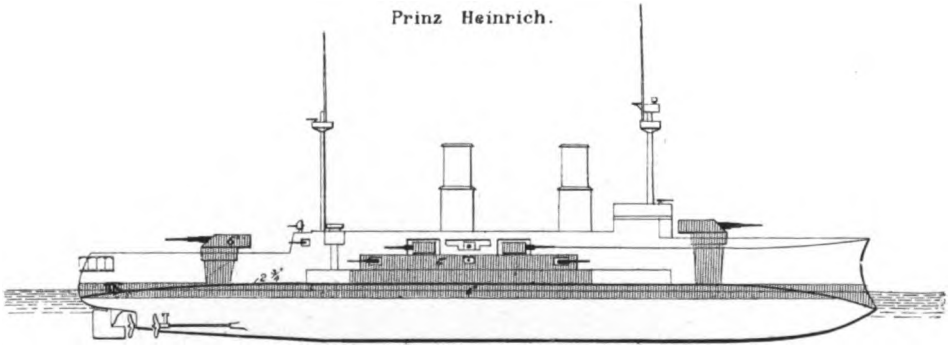
GERMANY.

ARMOURED CRUISER.

Prinz Heinrich.



See page 207.

PLATE 35.

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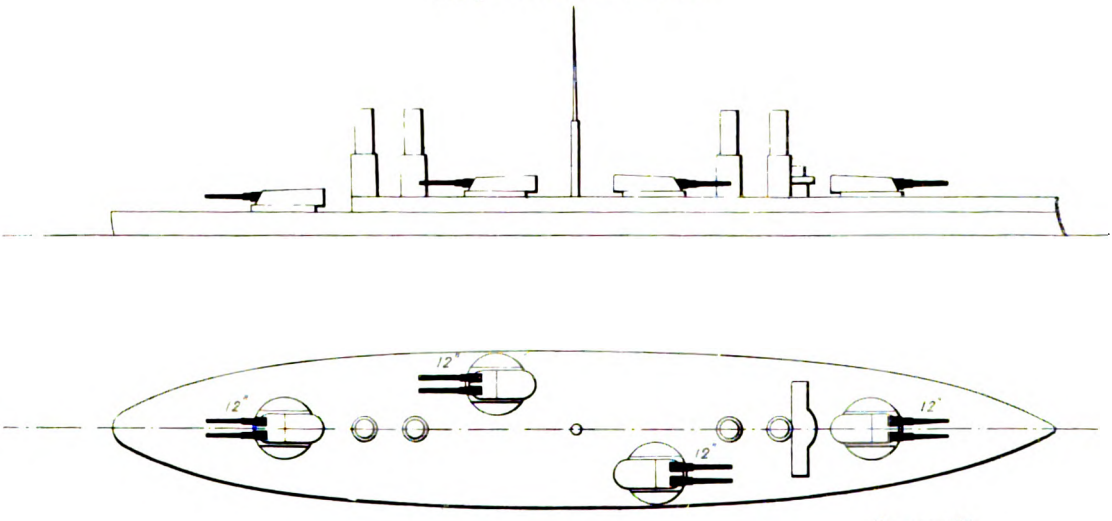
ITALY.

BATTLESHIPS.

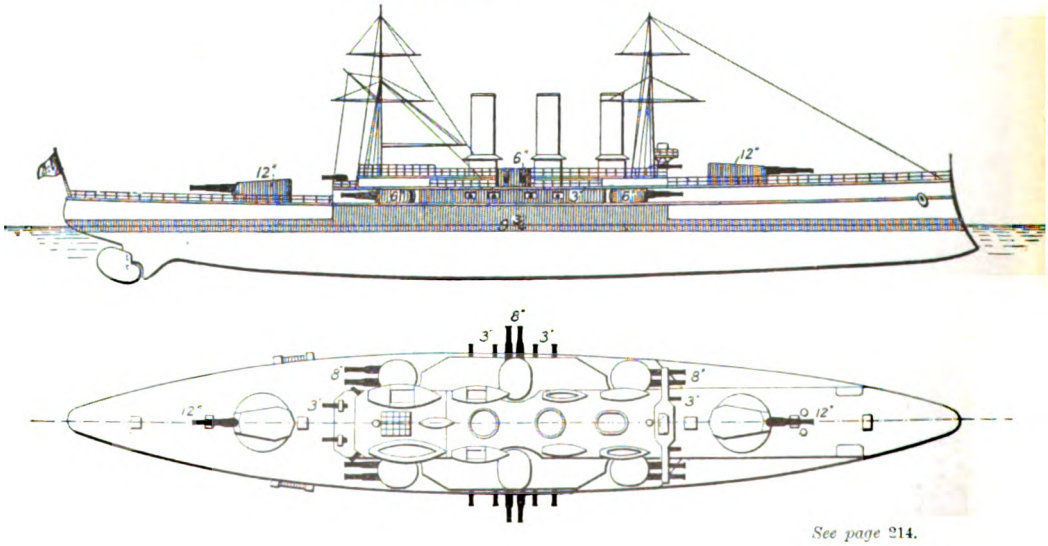
"A."

Design somewhat uncertain.



See page 213.

Vittorio Emanuele. **Napoli.**
Regina Elena. **Roma.**



See page 214.

PLATE 36.

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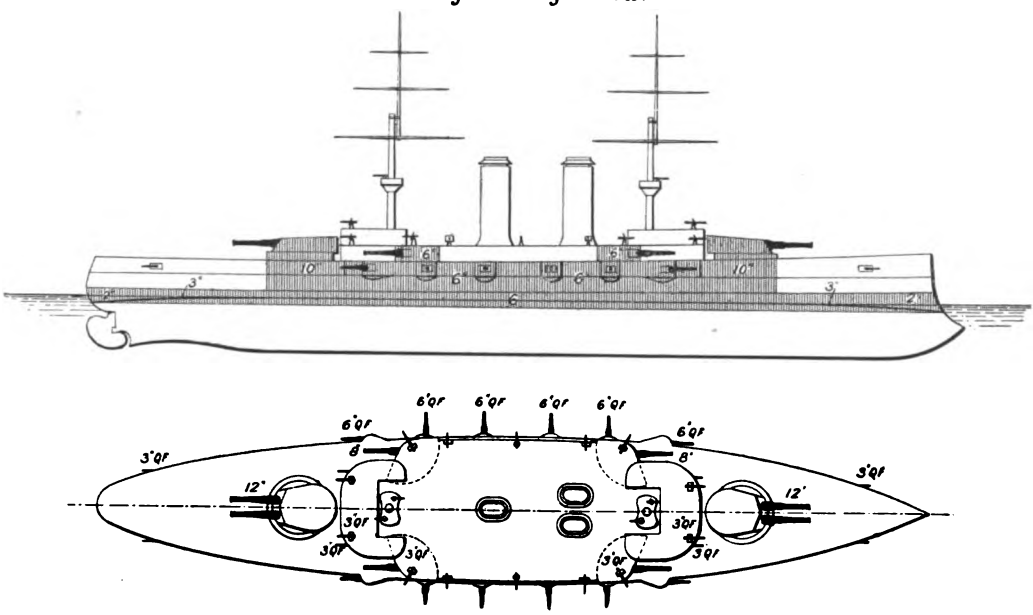
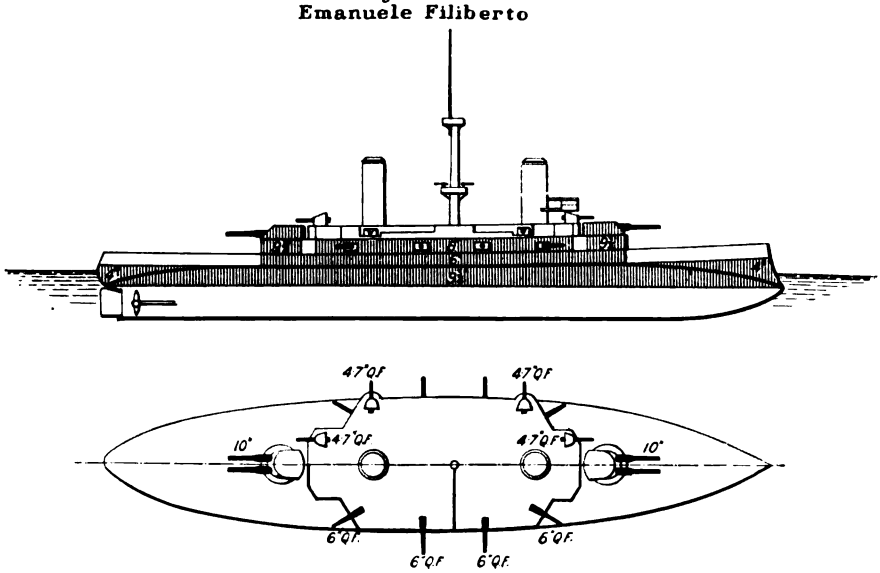
Benedetto Brin.
Regina Margherita.



See page 213.

Ammiraglio di St. Bon
Emanuele Filiberto



See page 213.

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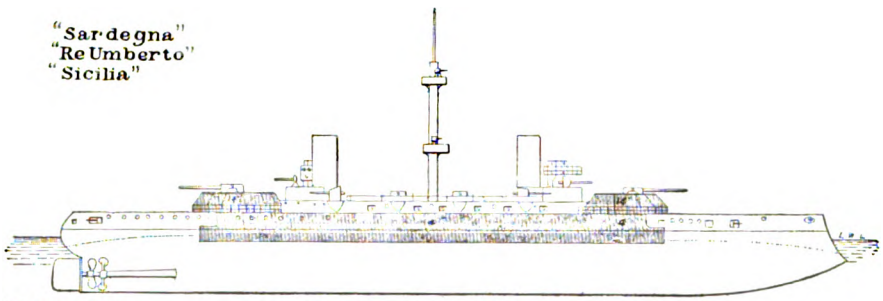
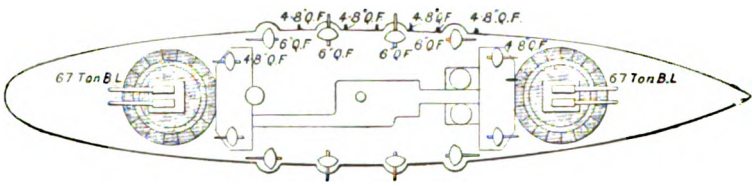
ITALY.

BATTLESHIPS.

"Sardegna"
"Re Umberto"
"Sicilia"



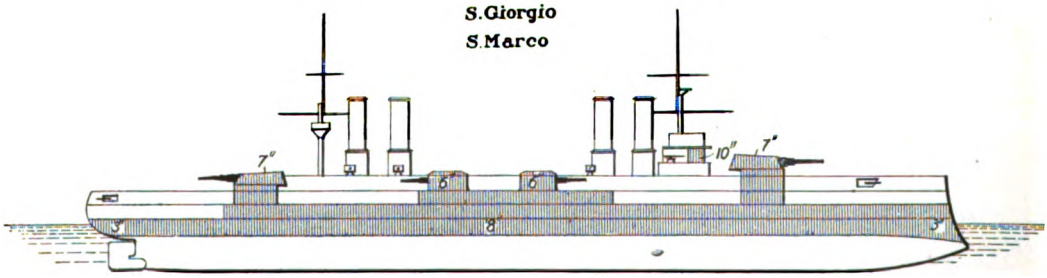
Note: Sardegna is 9 ft. 6 in. longer and 3 ft. 3 in. broader than the other two

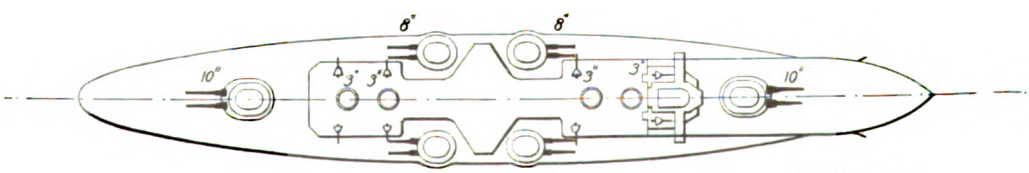


See page 214.

ARMOURED CRUISERS.

Amalfi
Pisa
S. Giorgio
S. Marco





See page 213.

PLATE 38.

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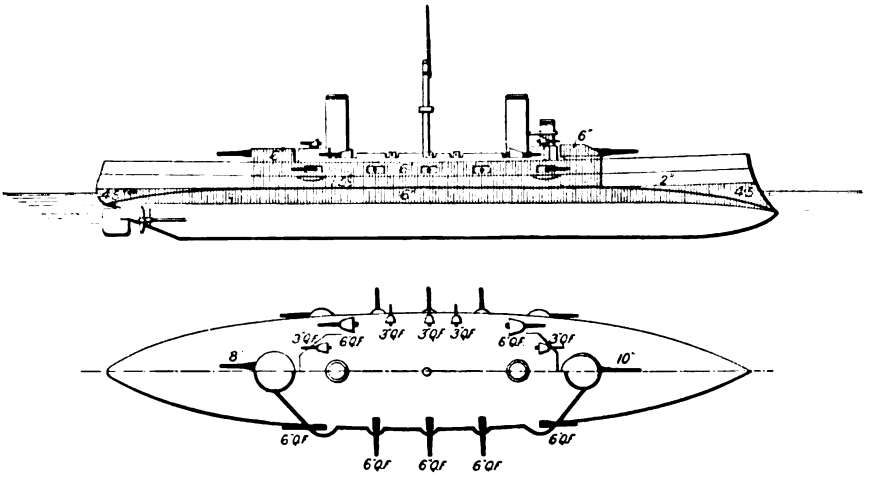
ITALY.

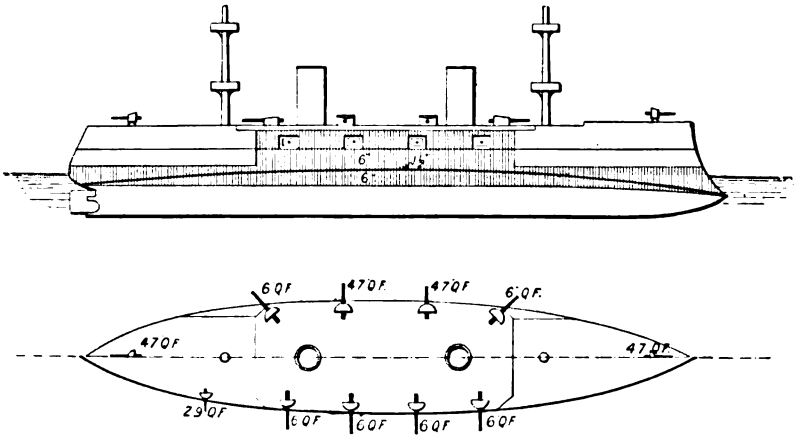
ARMOURED CRUISERS.

Francesco Ferrucio
Guiseppe Garibaldi
Varese



See page 213.

"Carlo Alberto"
"Vettor Pisani"



See page 213.

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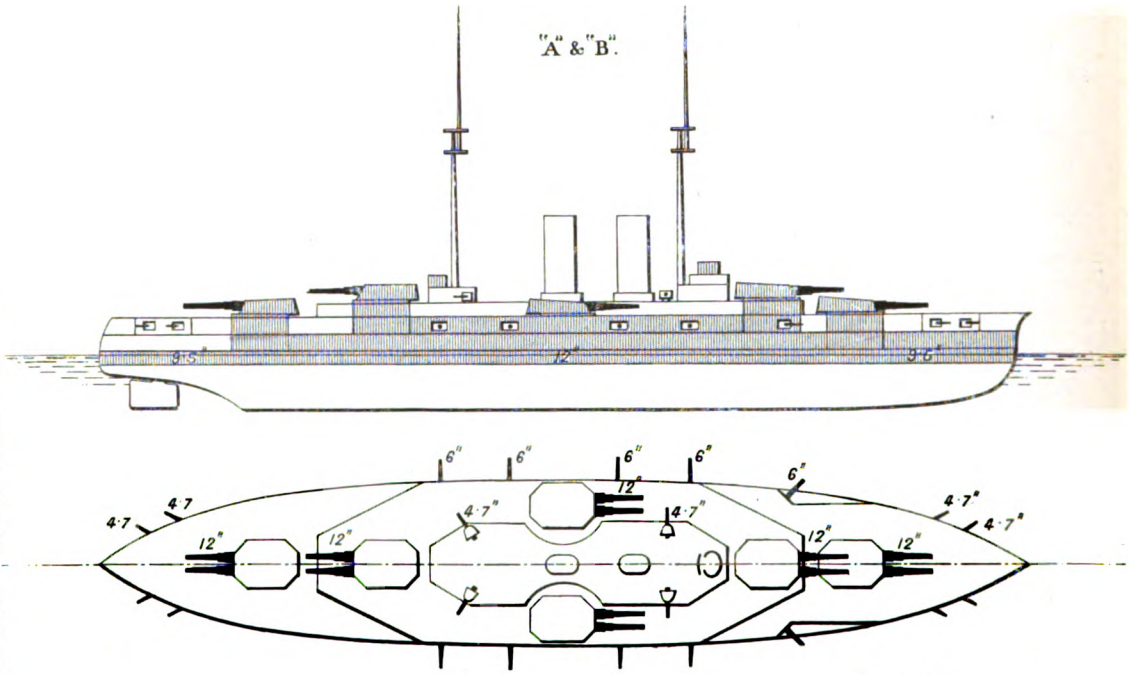
JAPAN.

Bbattleships.

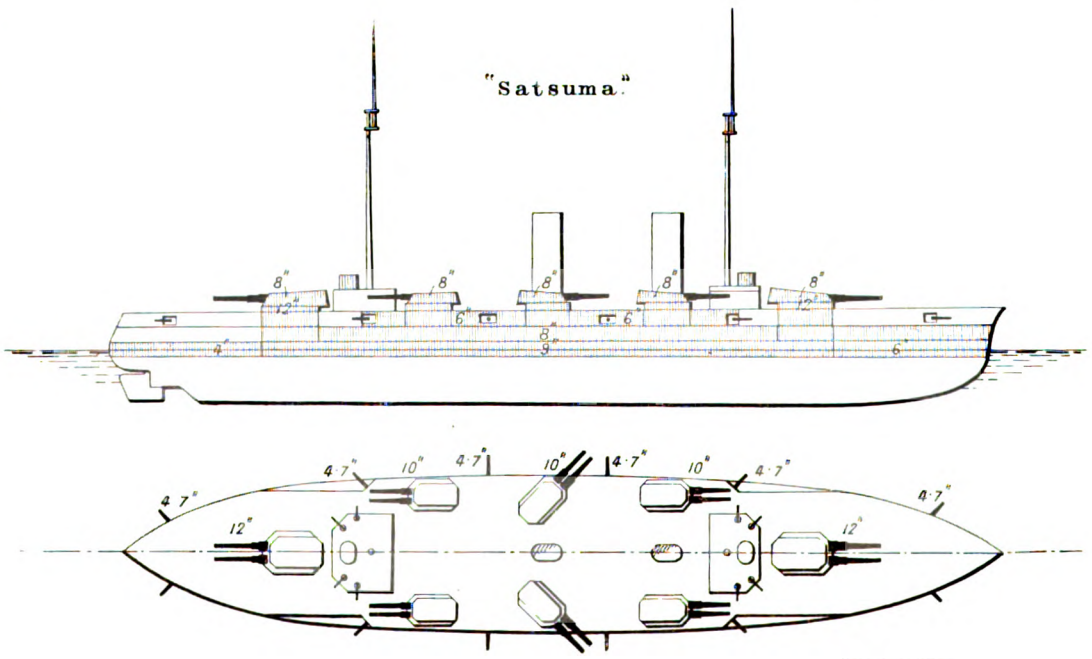
Plan uncertain.

"A" & "B".



See page 218.

"Satsuma."



See page 219.

PLATE 40.

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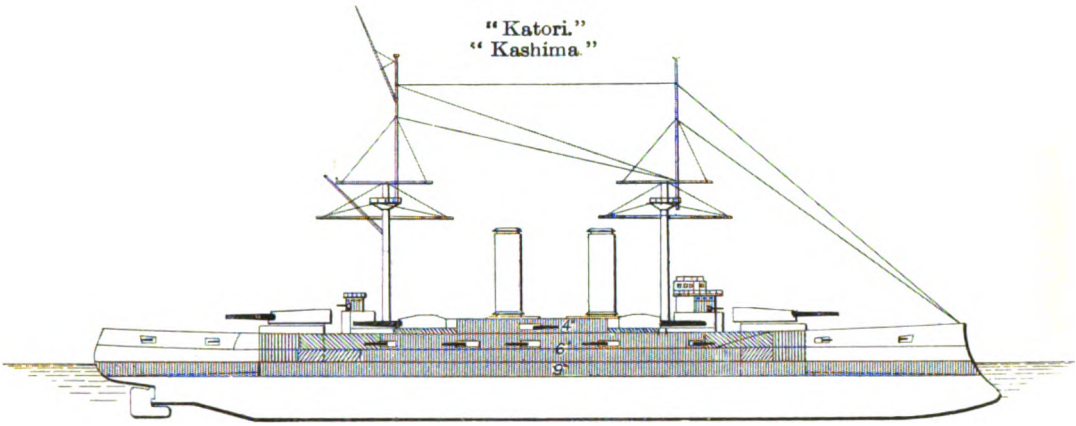
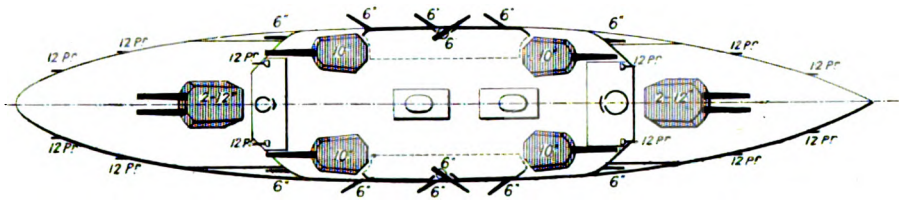
JAPAN.

BATTLESHIPS.

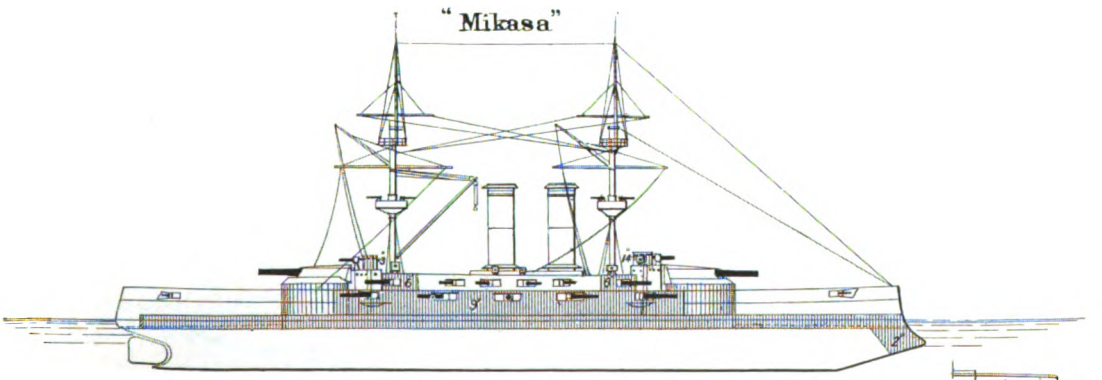
"Katori."
"Kashima."

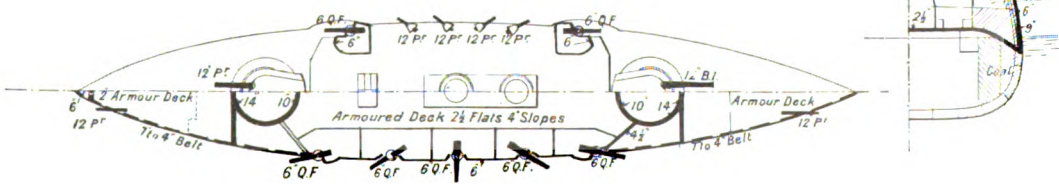




See page 219.

"Mikasa"





See page 219.

NOTE.—4 10-in. guns have been substituted for 4 6-in. on upper deck.

PLATE 41.

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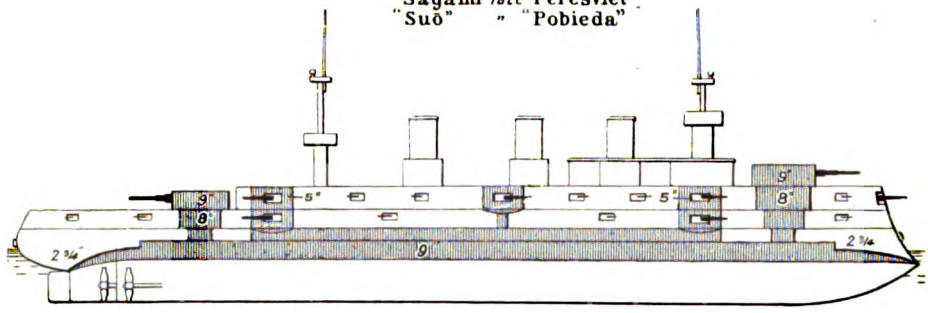
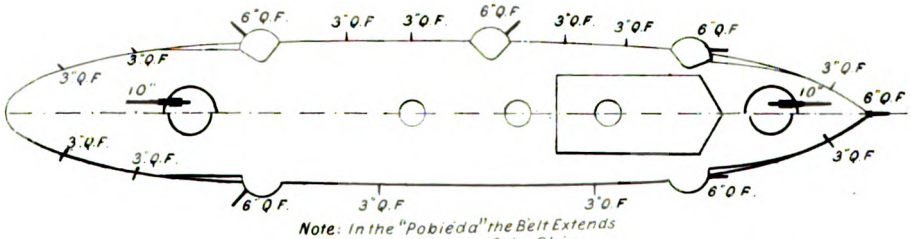
JAPAN.

BATTLESHIPS.

"Sagami" *late* "Peresviet"
"Suô" " "Pobieda"



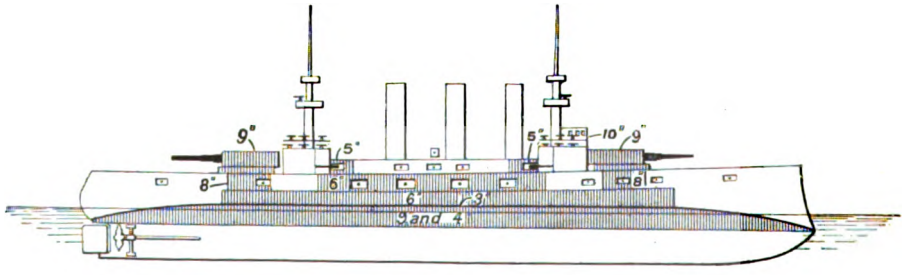


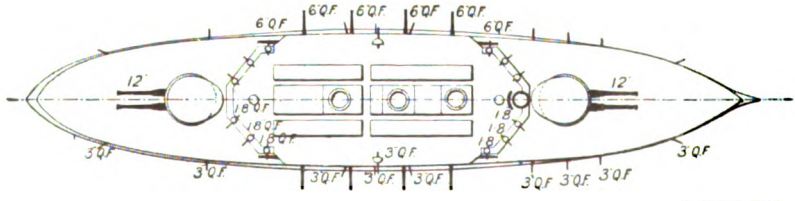
Note: In the "Pobieda" the Belt Extends the Full Length of the Ship.

See page 219.

See Plate 50 for Iwami, *ex* Orel.

"Hizen" *late* "Retvizan"





See page 218.

PLATE 42.

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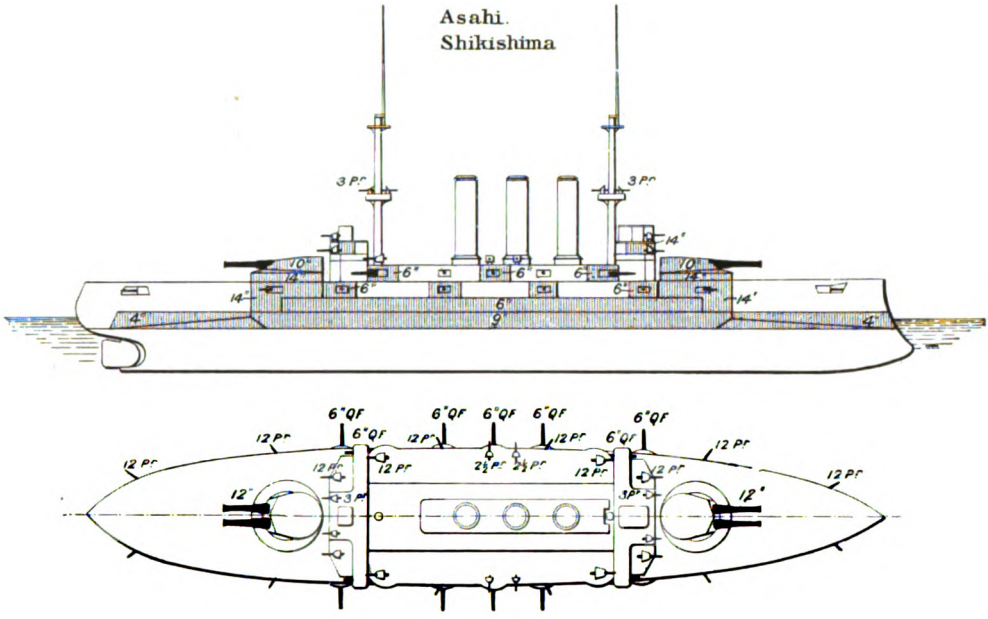
JAPAN.

BATTLESHIPS.

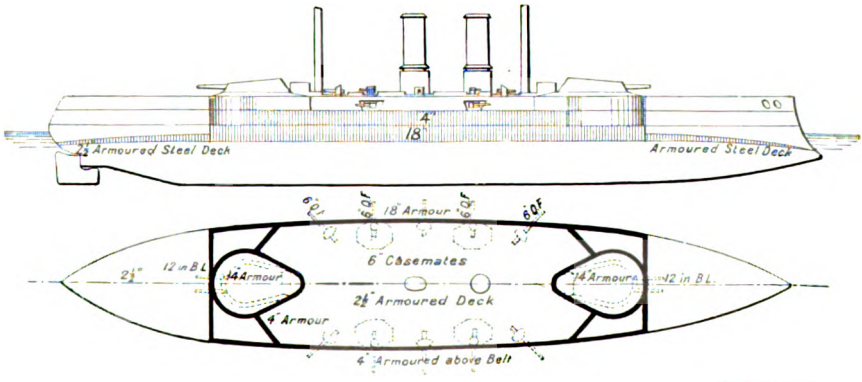
Asahi.
Shikishima



The "Asahi" has but two funnels.

See page 218.

"Fuji."



See page 218.

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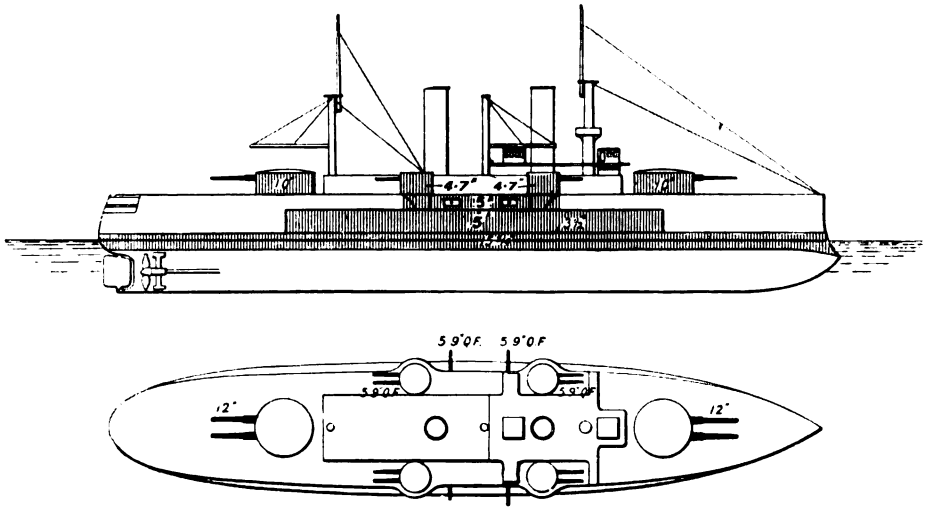
JAPAN.

BATTLESHIPS.

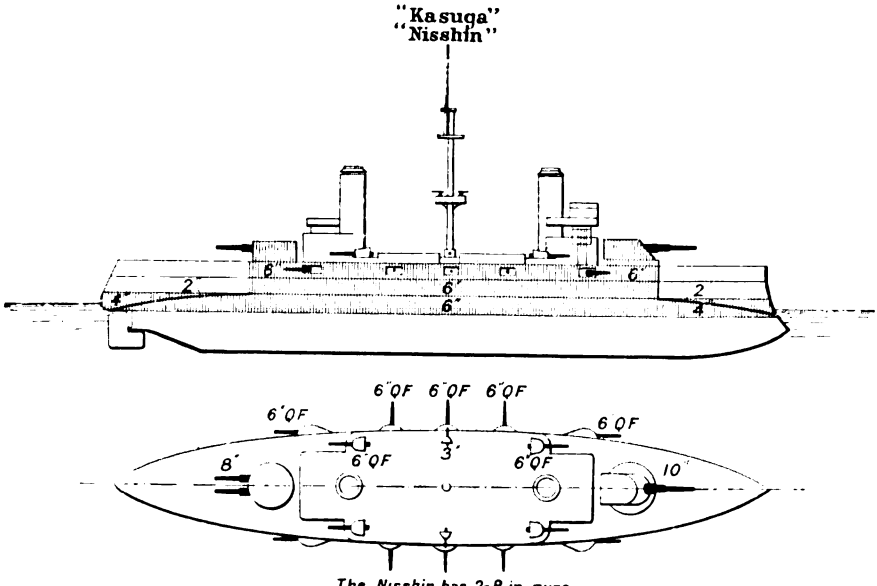
"Tango" *late* "Poltava"



See page 219.

ARMOURED CRUISERS.

"Kasuga" "Nisshin"



The Nisshin has 2-8 in. guns in fore barbette.

See page 219.

PLATE 44.

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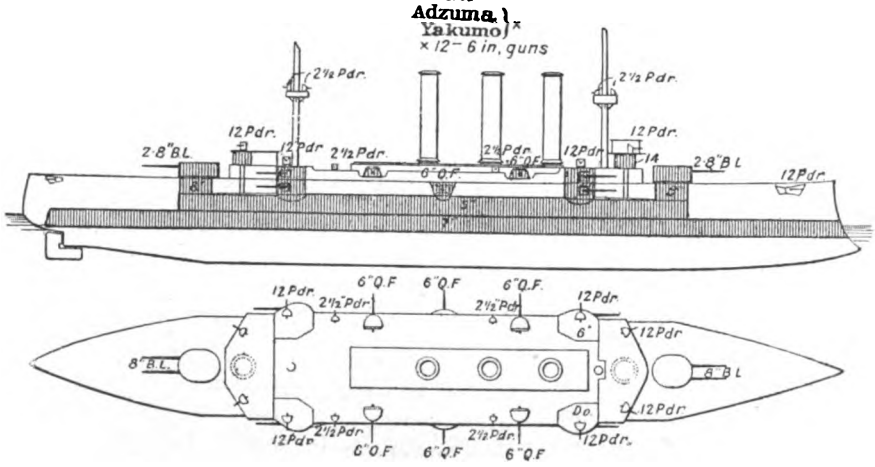
JAPAN.

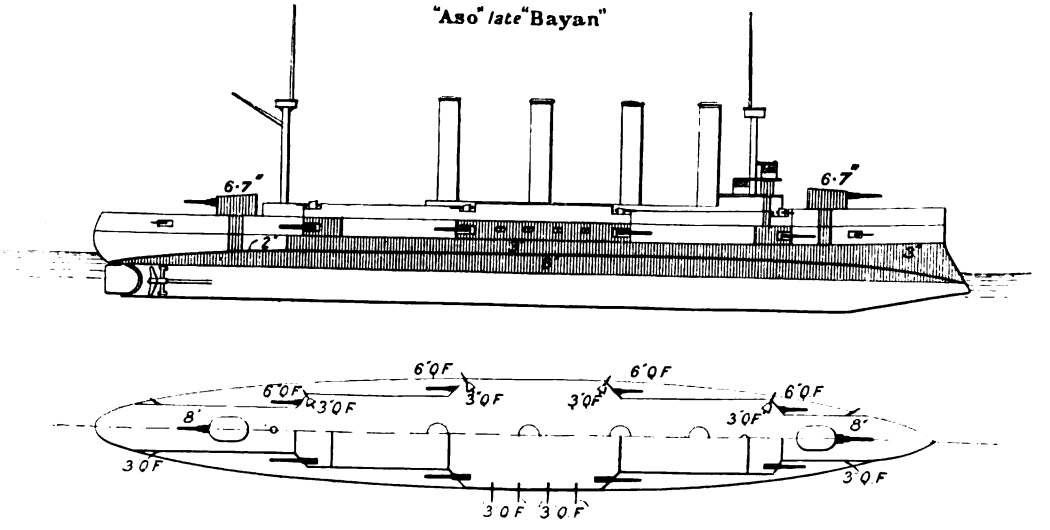
ARMOURED CRUISERS.

Idzumo
Iwati
Adzuma }
Yakumo } ×
× 12–6 in. guns



See page 218.

"Aso" *late* "Bayan"



See page 218.

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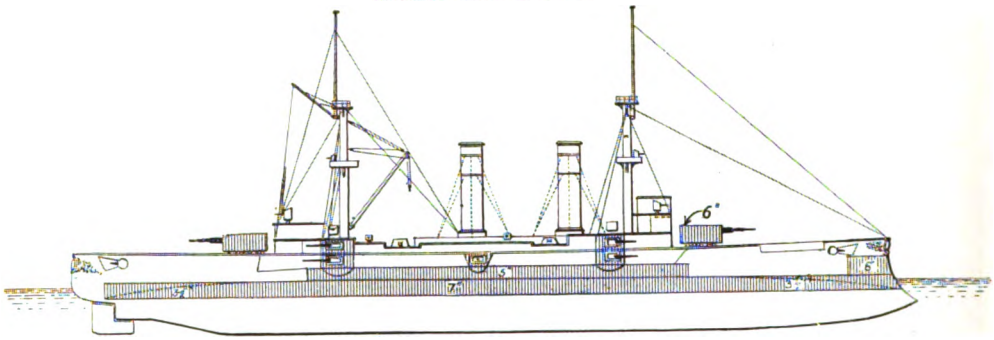
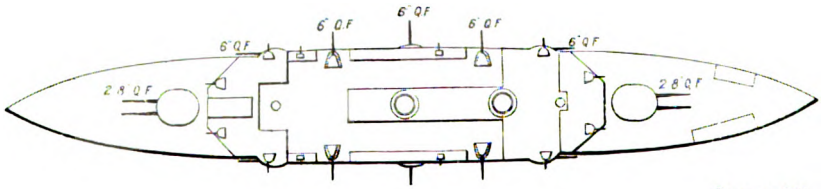
JAPAN.

ARMOURED CRUISERS.

Asama and Tokiwa

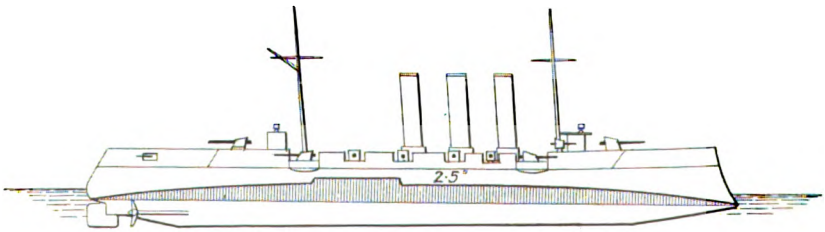


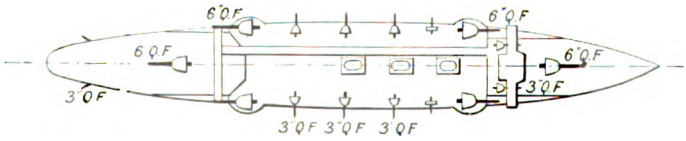


See page 218.

CRUISERS.

Niitaka.
Tsushima





See page 220.

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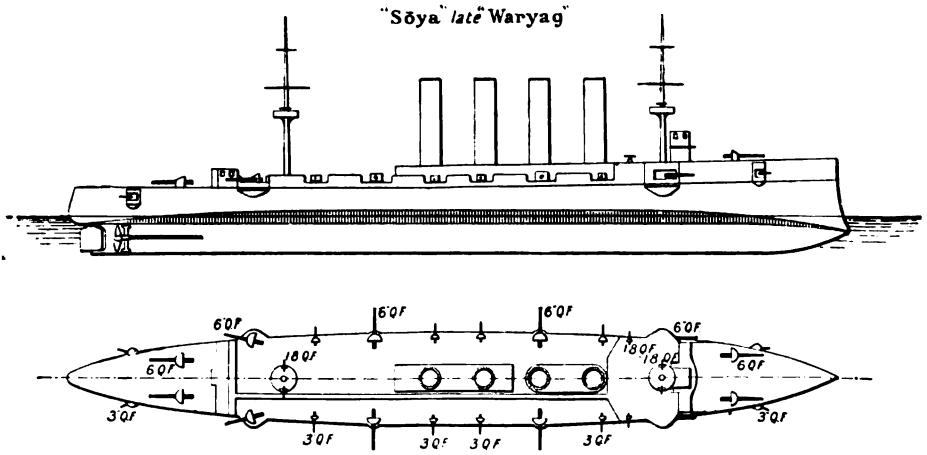
JAPAN.

CRUISER.

"Sōya" *late* "Waryag"



See page 221.

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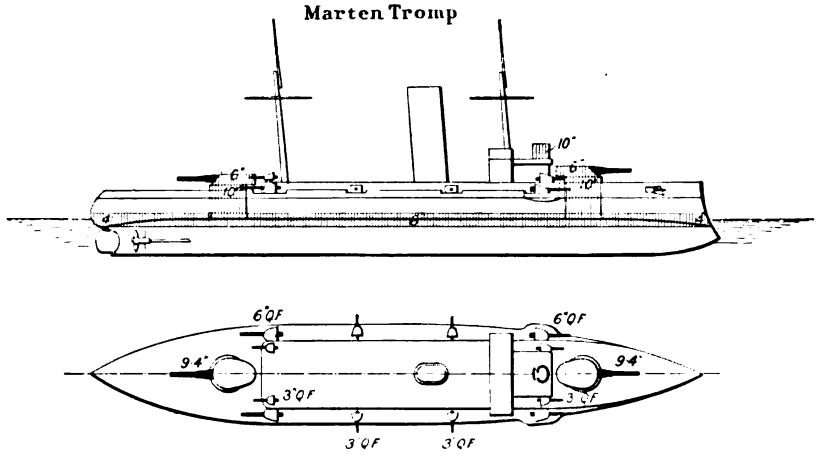
NETHERLANDS.

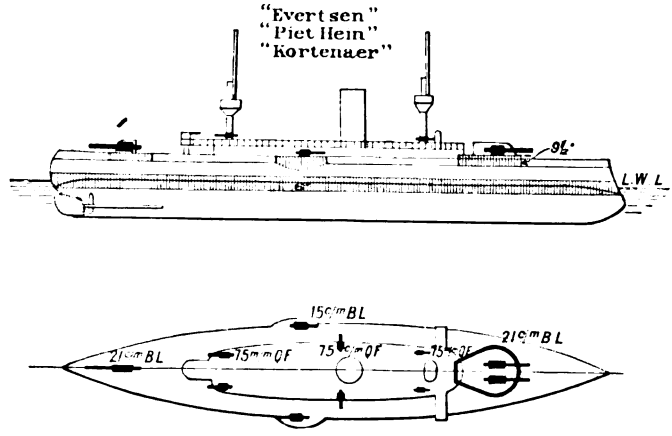
COAST DEFENCE SHIPS.

De Ruyter
Hertog Hendrik
Koningin Regentes
Marten Tromp



See page 222.

"Evertsen"
"Piet Hein"
"Kortenaer"



See page 222.

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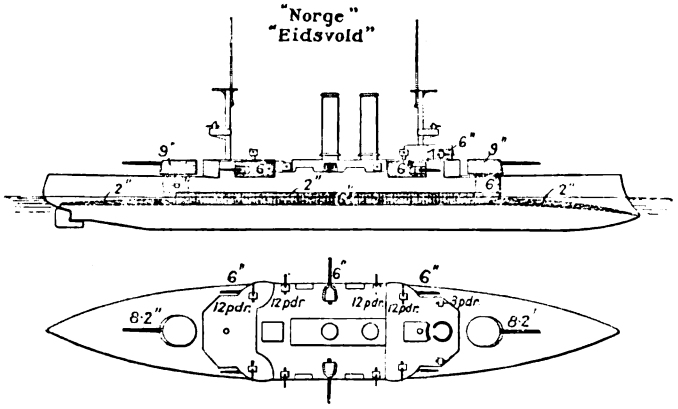
BATTLESHIPS.

"Norge"
"Eidsvold"



See page 225.

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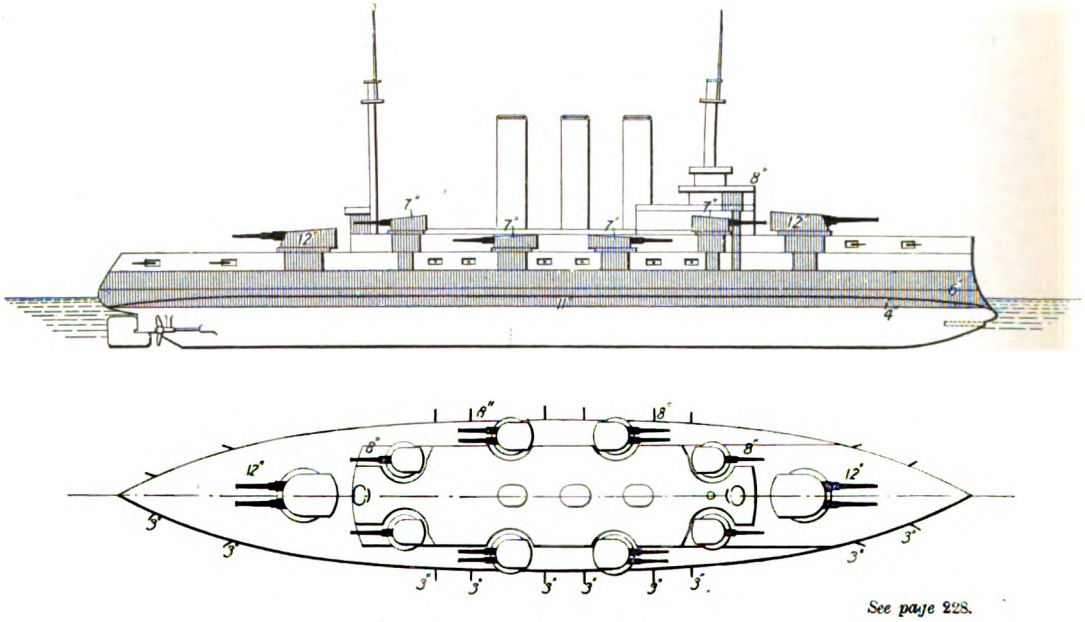
RUSSIA.

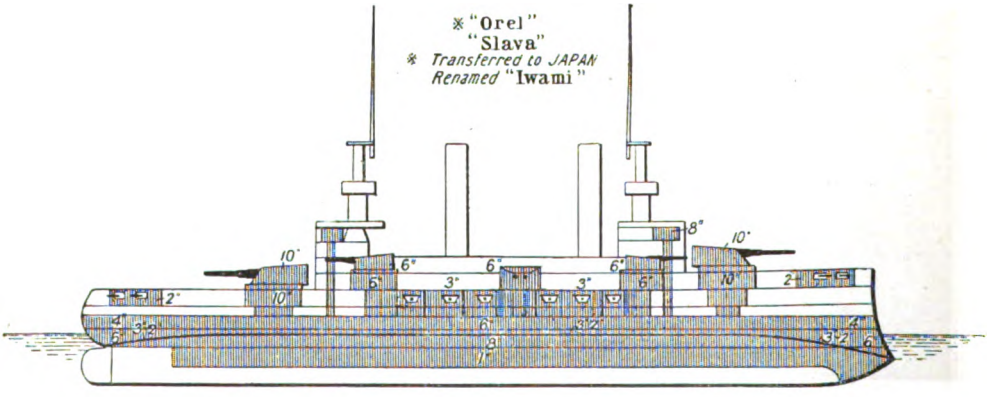
BATTLESHIPS.

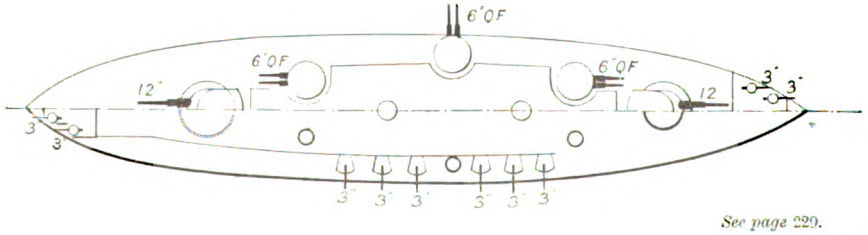
Imperator Pavel
Andrei Pervozvannyi



See page 228.

* "Orel"
"Slava"
* Transferred to JAPAN
Renamed "Iwami"





See page 229.

PLATE 50.

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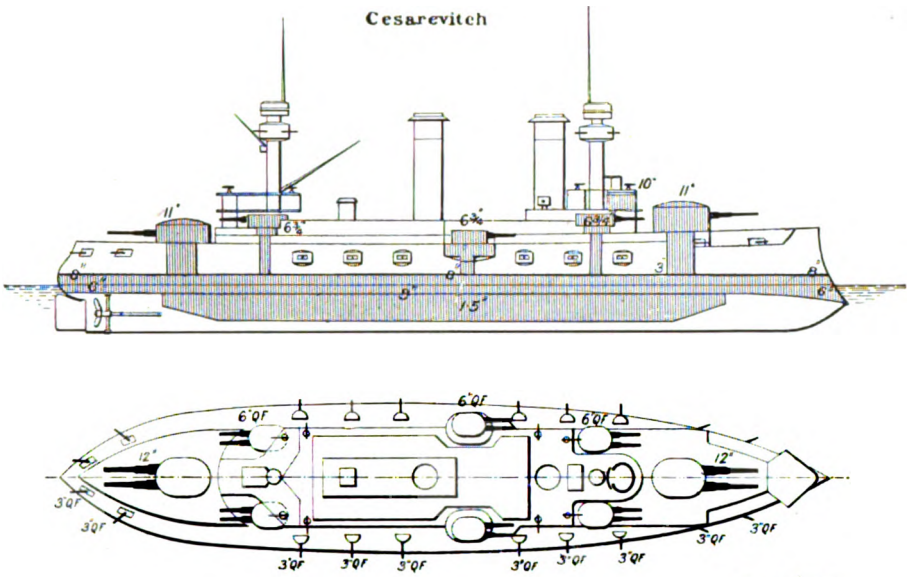
RUSSIA.

BATTLESHIPS.

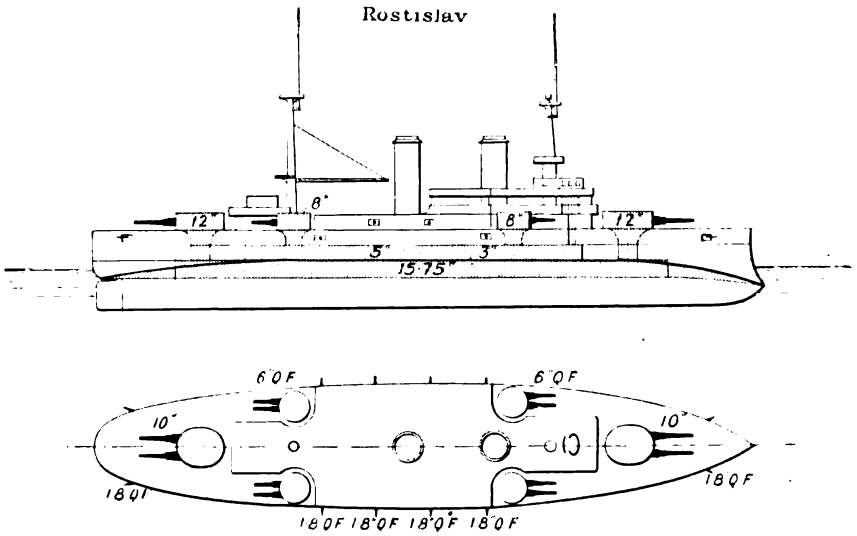
Cesarevitch


11"
6"
6"
10"
11"
12"
12"
3"
3"
3

RUSSIA.

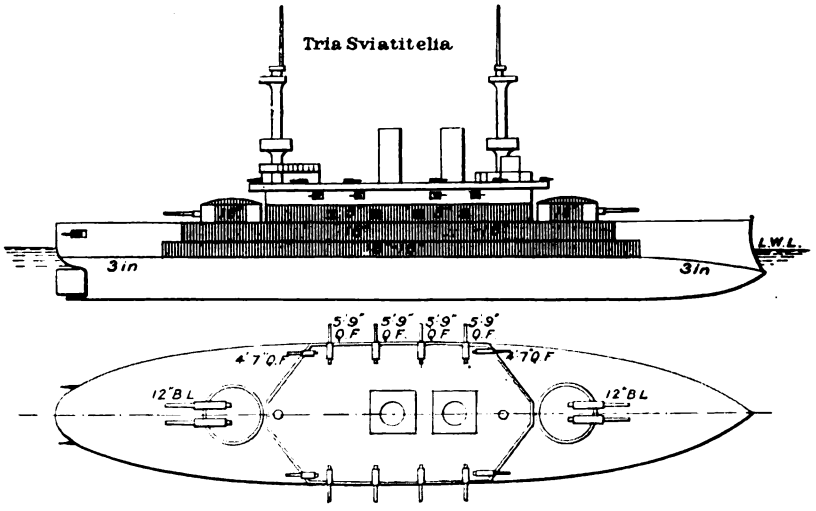
BATTLESHIPS.

Rostislav



See page 229.

Tria Sviatitelia



See page 229.

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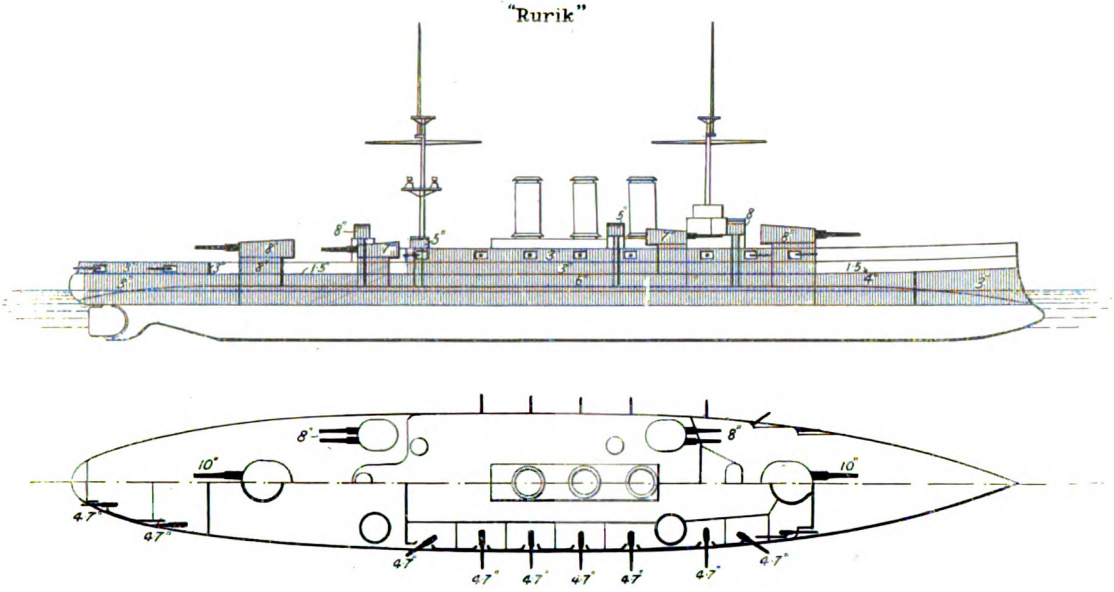
RUSSIA.

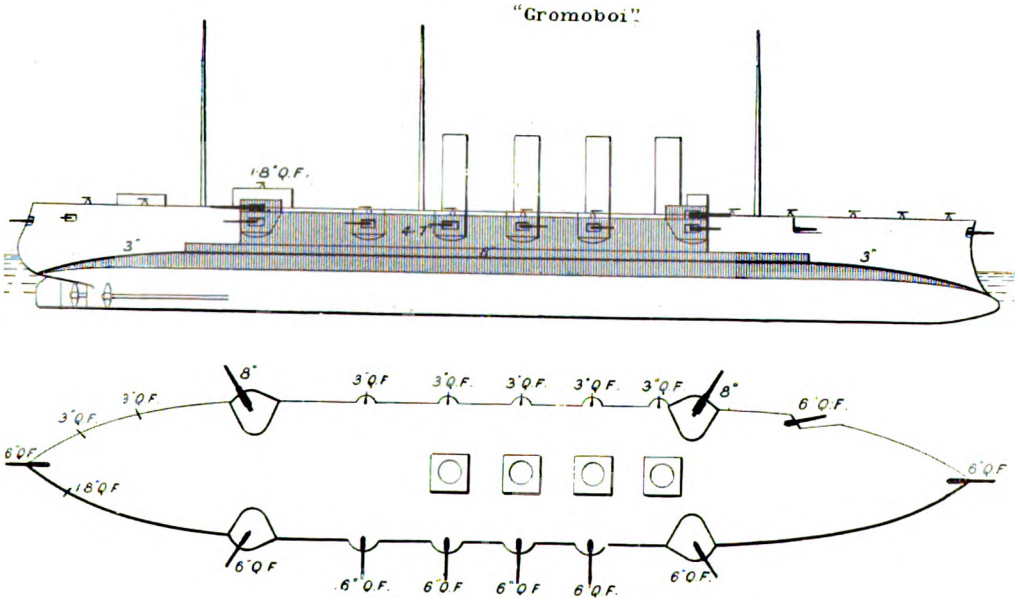
ARMOURED CRUISERS.

"Rurik"



See page 229.

"Gromoboi"



See page 228.

PLATE 53.

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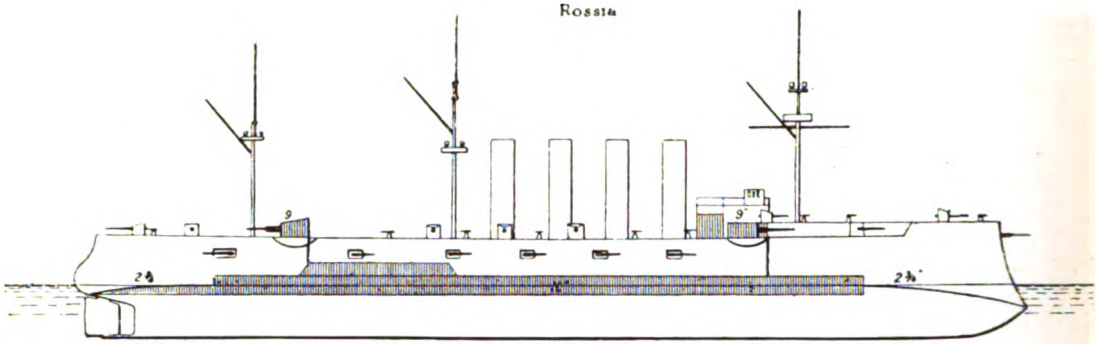
RUSSIA.

ARMOURED CRUISER.

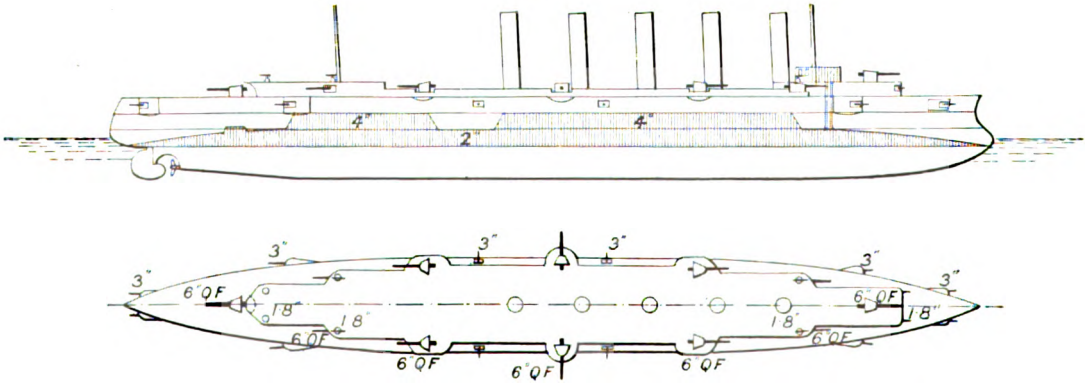
Rossia



See page 229.

CRUISER.

"Askold"



See page 230.

PLATE 54.

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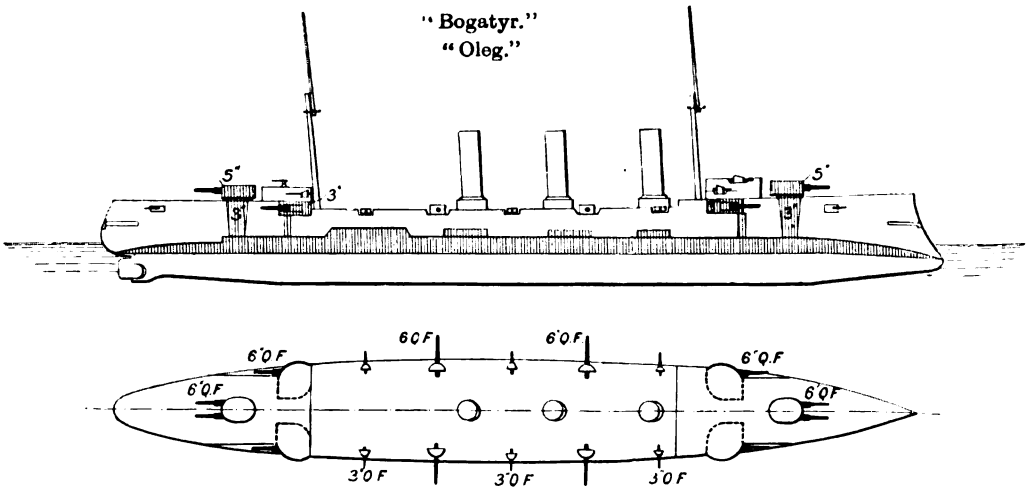
CRUISERS.

"Bogatyr."
"Oleg."



See page 230.

PLATE 55.

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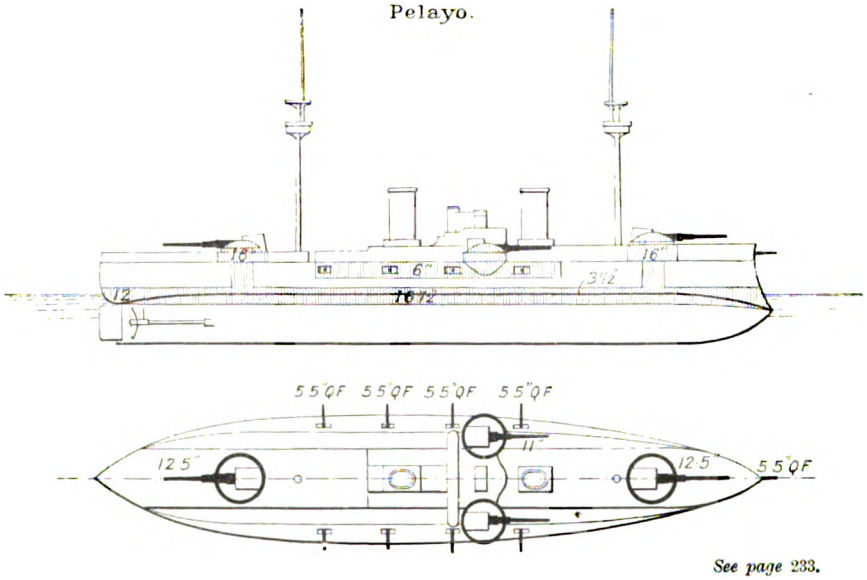
SPAIN.

BATTLESHIP.

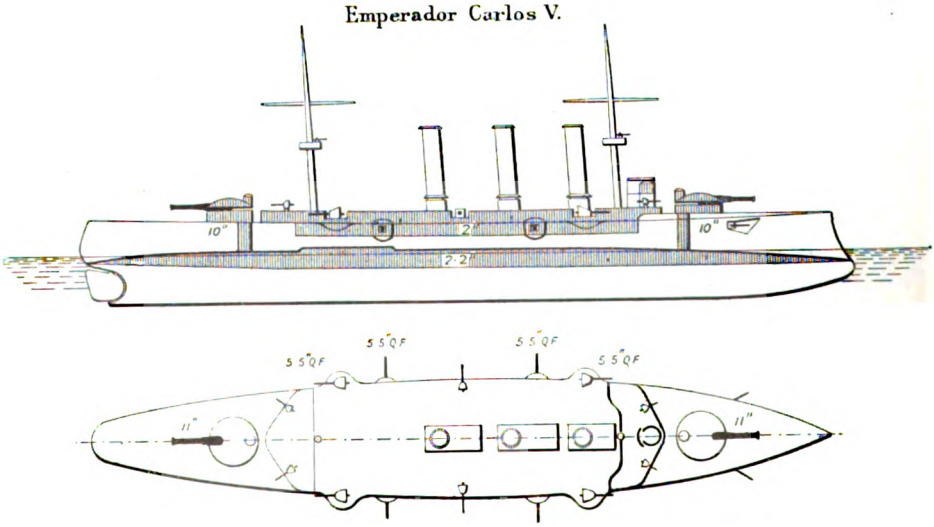
Pelayo.



See page 233.

ARMOURED CRUISER.

Emperador Carlos V.



See page 233.

PLATE 56.

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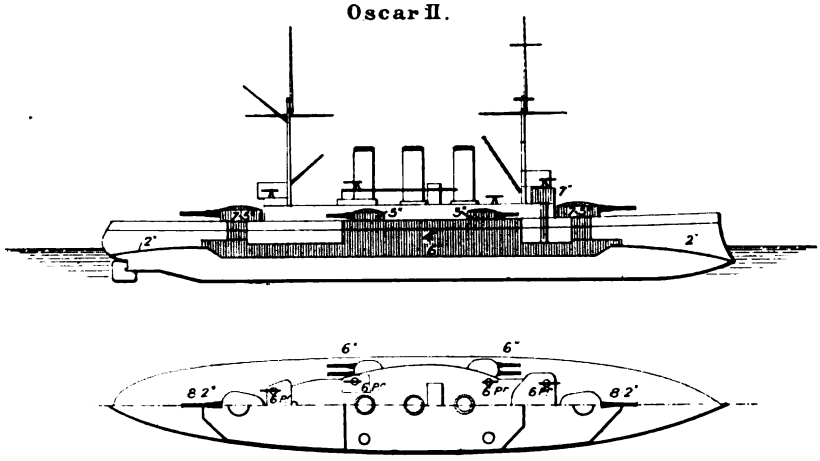
SWEDEN.

BATTLESHIP.

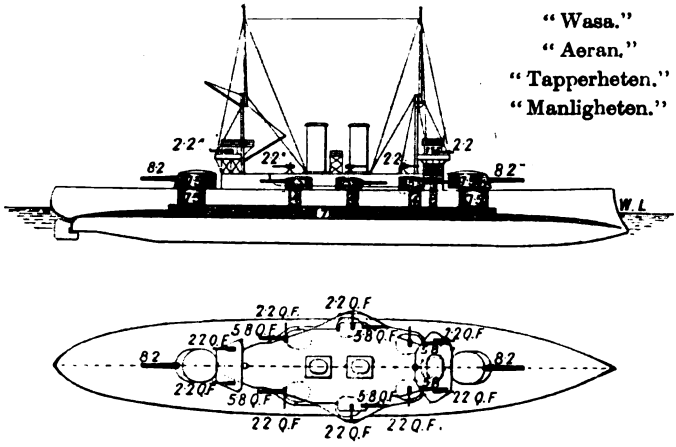
Oscar II.



See page 235.

COAST DEFENCE SHIPS.

"Wasa."
"Aeran."
"Tapperheten."
"Manligheten."



See page 235.

PLATE 57.

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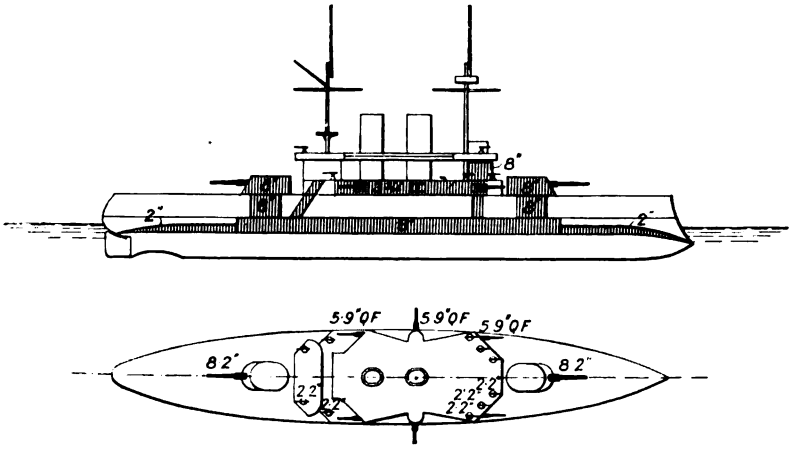
SWEDEN.

COAST DEFENCE SHIP.

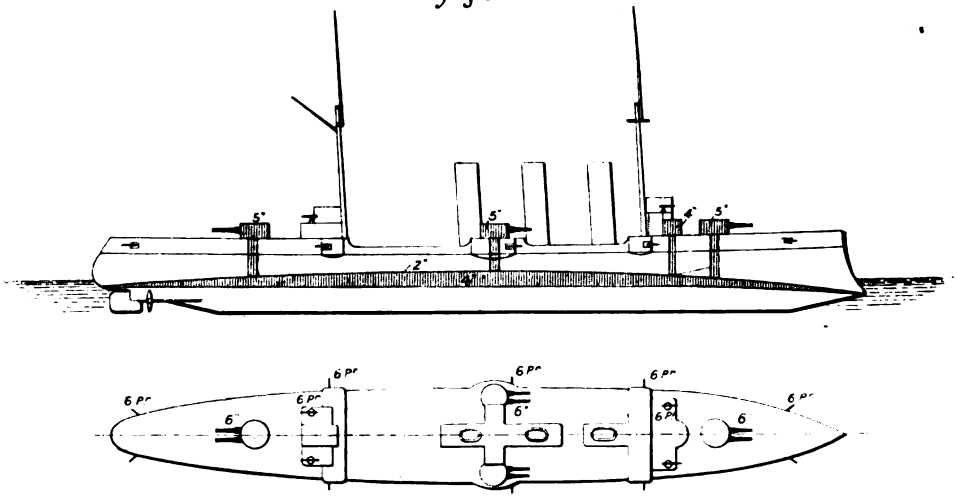
"Dristigheten"



See page 235.

ARMOURED CRUISER.

Fylgia.



See page 235.

PLATE 58.

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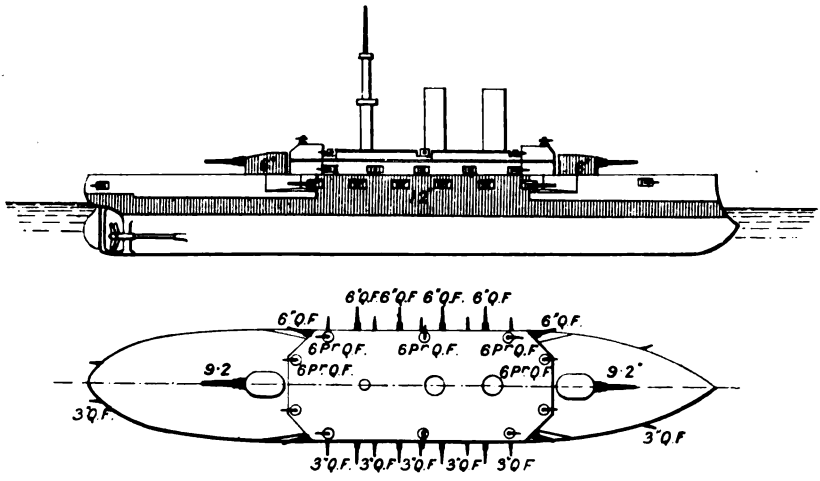
TURKEY.

BATTLESHIP.

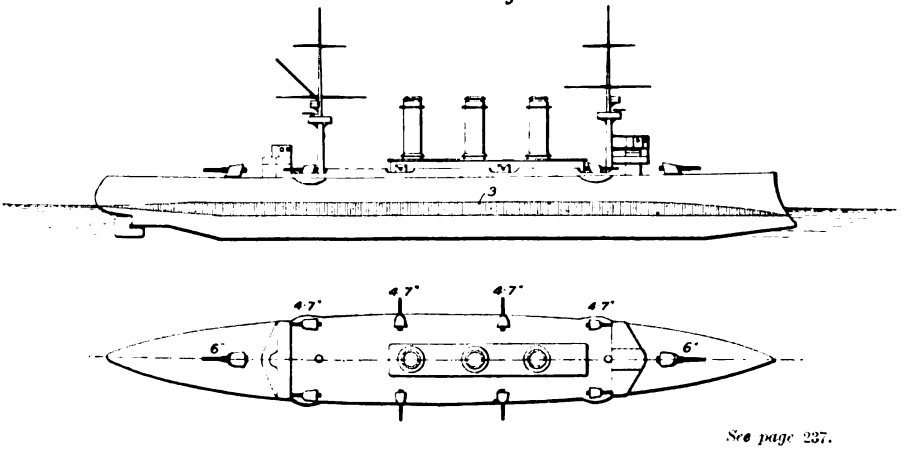
Messoudieh.



See page 237.

CRUISERS.

Abdul Hamid.
Abdul Medjid.



See page 237.

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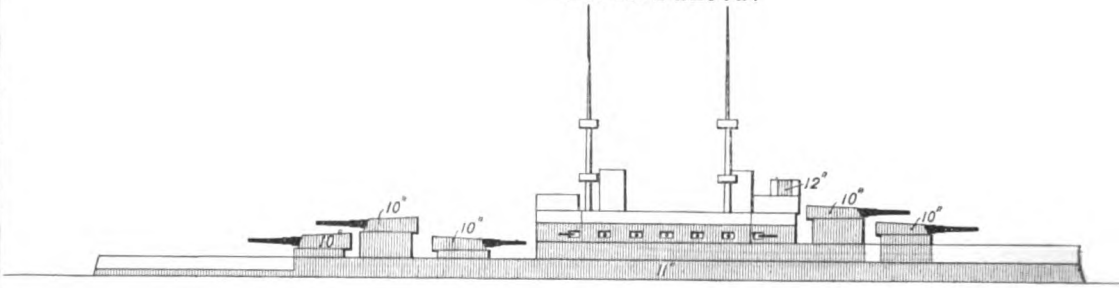
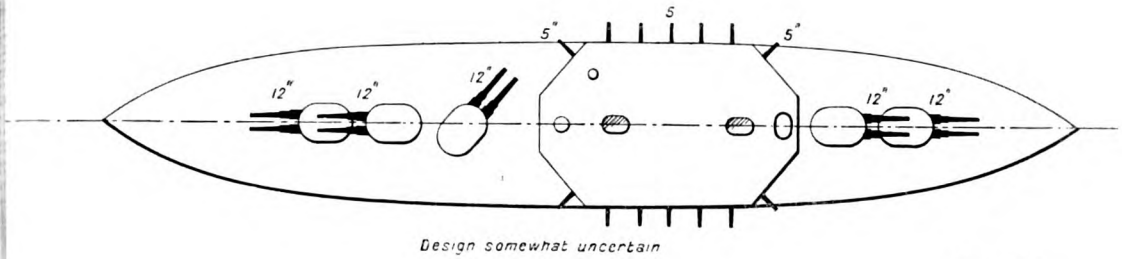
UNITED STATES.

BATTLESHIPS.

"Delaware".
"North Dakota".





Design somewhat uncertain

See page 238.

Michigan
South Carolina

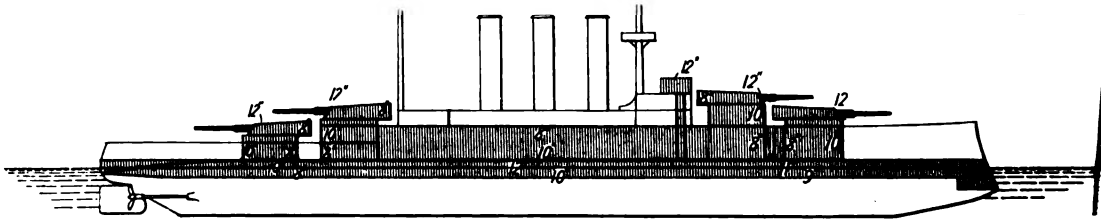


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PLATE 60.

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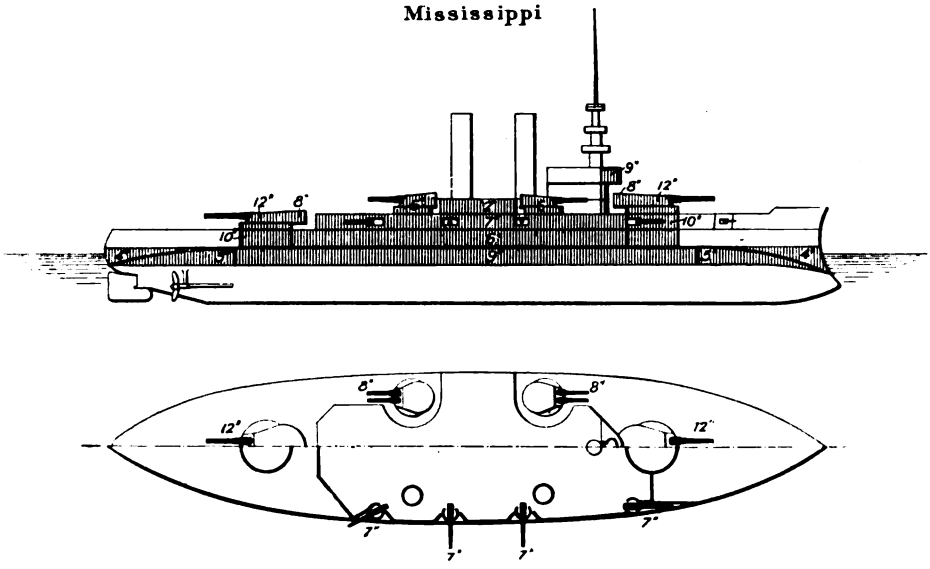
UNITED STATES.

BATTLESHIPS.

Idaho
Mississippi



See page 238.

"Connecticut."
"Louisiana."
"Kansas."
"Minnesota."
"Vermont."
"New Hampshire."

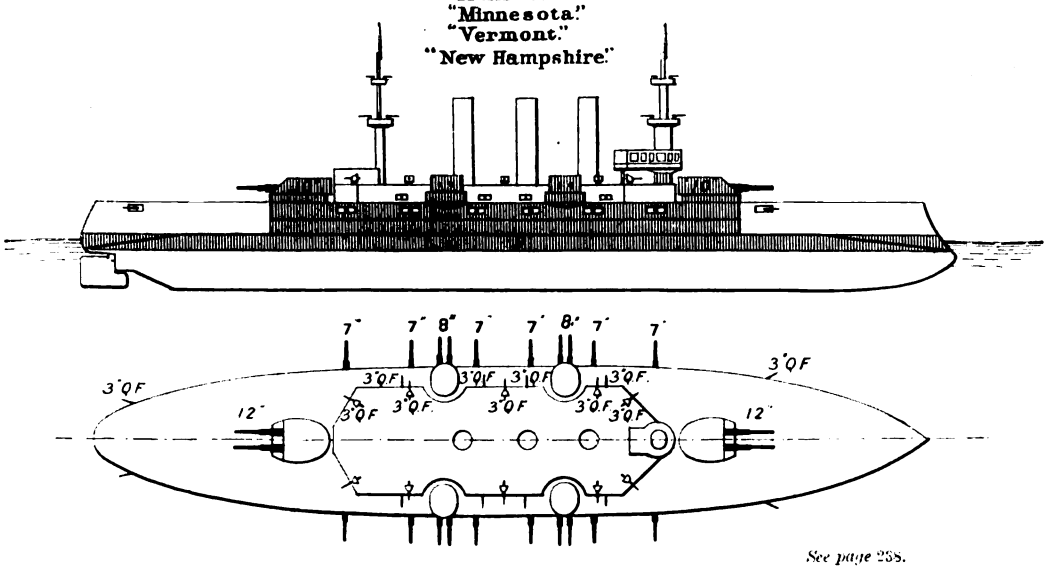


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PLATE 61.

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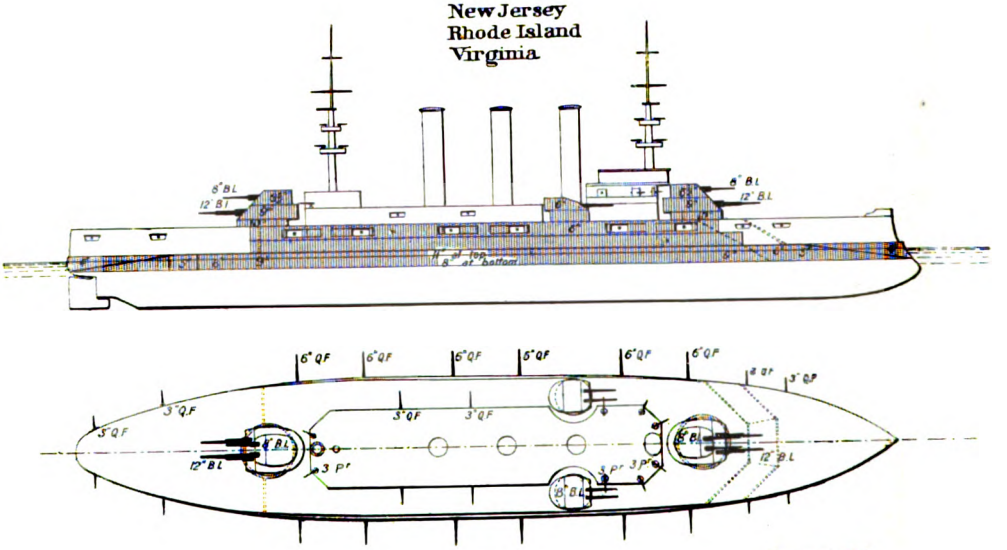
UNITED STATES.

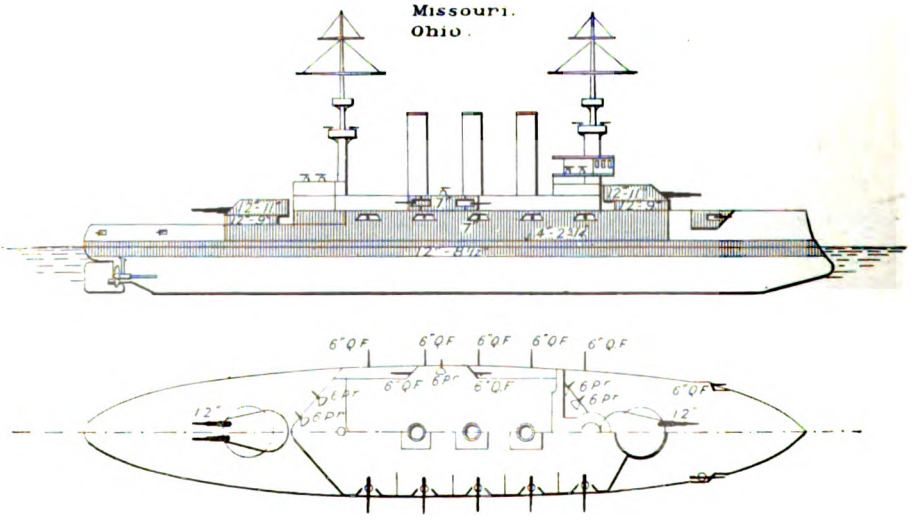
BATTLESHIPS.

Georgia
Nebraska
New Jersey
Rhode Island
Virginia



See page 238

Maine
Missouri.
Ohio.



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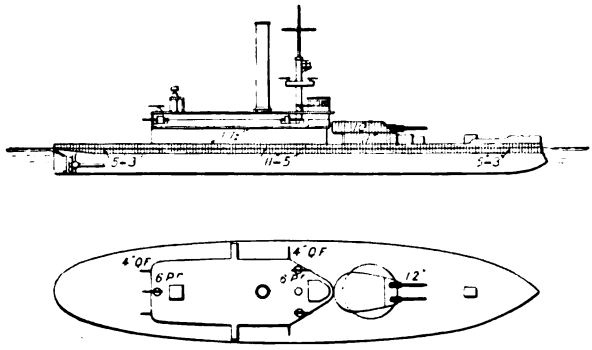
UNITED STATES.

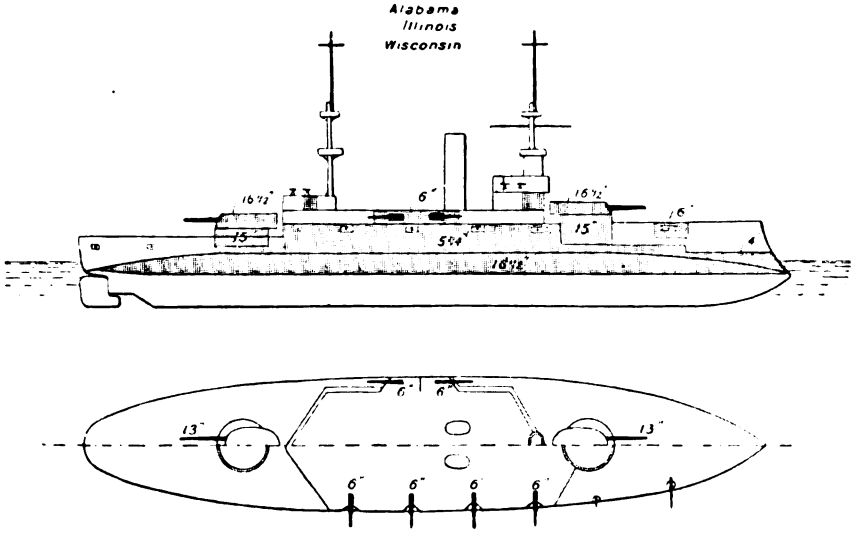
BATTLESHIPS.

Florida.
Nevada.
Wyoming.
Arkansas.



See page 238.

Alabama
Illinois
Wisconsin



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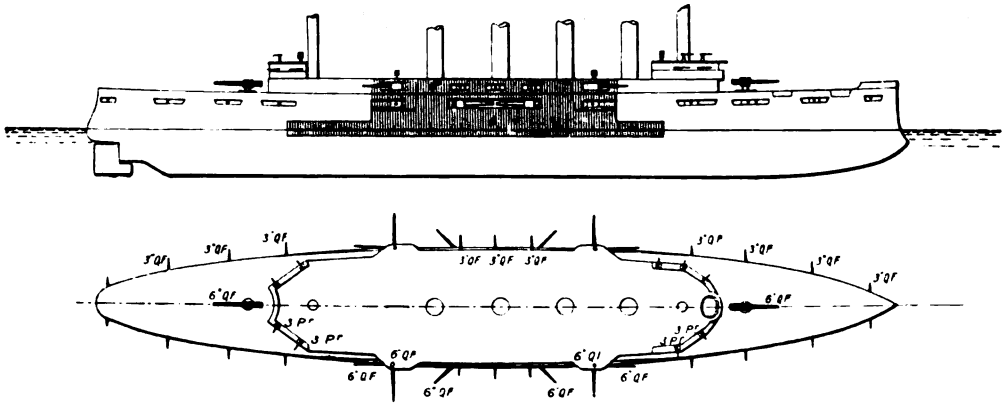
UNITED STATES.

ARMOURED CRUISERS.

Charleston.
Milwaukee.
St Louis



See page 238.

"Brooklyn"

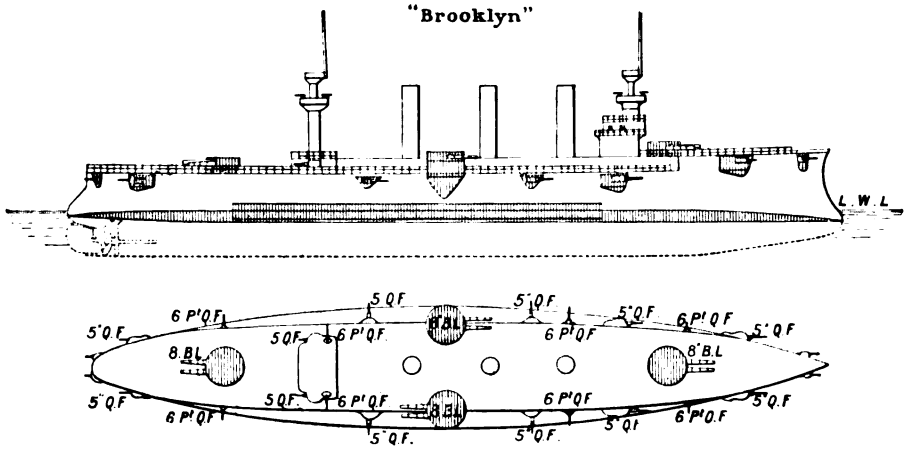


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PLATE 66.

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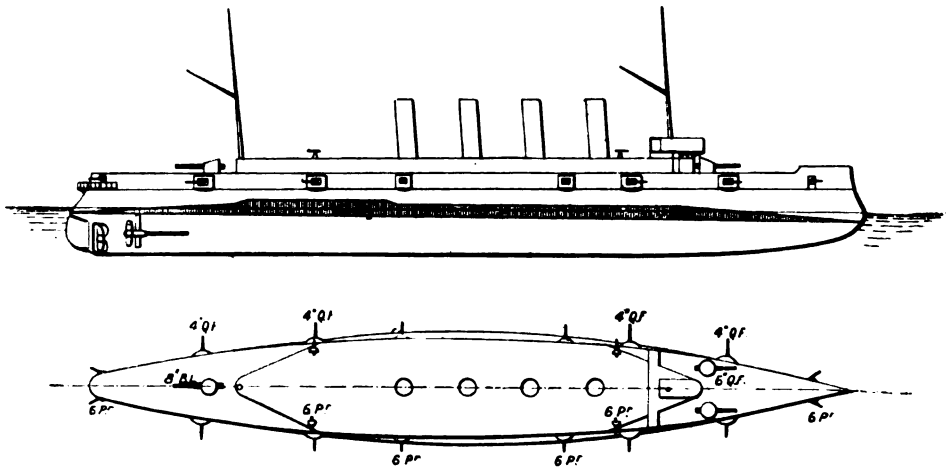
CRUISERS.

Columbia.
Minneapolis



Note - *Minneapolis has only two funnels.*

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PART III.

ARMOUR AND ORDNANCE.

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PART III.

ARMOUR AND ORDNANCE.

In the *Naval Annual* for 1907 this section was omitted. The difficulties of reviewing adequately the progress of armour and ordnance have very much increased. Whereas in past times information, except such as was in the nature of trade secrets, was easily procurable, of late the tendency, both at home and abroad, has been for all makers of war material to be more reticent and less inclined to afford facilities of the kind. That this has been due to the pressure put upon manufacturers and shipbuilders alike by their respective Governments is unquestionable, and if the public interests are served thereby it is not for us to make complaint of the atmosphere of mystery which has been created. At the same time, the general prohibition of facts relating to the trials of new guns, armour plates and projectiles is, from a professional point of view, the more to be deplored, since there is every reason to believe that the actual results obtained of late have been most fruitful and full of interest.

Official report of progress.

In the recent Statements of the First Lord of the Admiralty issued with the Navy Estimates, it has been announced that progress in manufacture and supply of ordnance and armour has been satisfactory, and that the guns have been ready when required. From this source, too, we have learnt that during the last three years exhaustive experiments upon night sights had resulted in obtaining a good optical sight which has been adopted in the more important gun-mountings. That, moreover, the improvements in sights were continuing on the lines of increased accuracy; that the newest types of sights had proved to be very successful; and that the only delay which had taken place was caused by the trial of a novel proposal for re-sighting the turrets. As regards the guns, an improved design, the 12-in. of 50 calibres, had been accepted, and was to form the principal armament of the new battleships. Furthermore, steel of greater tensile strength and higher tenacity had been introduced both for new guns and for the repair of the older patterns. Then again, improvements with new mountings had been effected, principally in the direction of reducing the time required

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for loading by a more extensive use of power-worked appliances. Designs of electrically-operated mountings for heavy guns had been worked out, and mountings of two different designs had been under trial. The experiments, also, having for their object improvements in the appliances for training and elevating guns, had given very promising results, and were being continued. The introduction of a new pattern of armour-piercing shell was also noted, and the facts that with it greater penetration could be obtained, the supply had become general throughout the Fleet, and the difficulties of manufacture overcome. Equally important was the announcement that the whole question of firing guns by dynamo power had been settled, and that with this system miss-fire should be in the future considerably less than with the primary cell arrangement formerly in general use. While in connection with the supply of the necessary implements for accurate firing at long ranges, we were told that the purchase of electric instruments, cables, range-finders and other accessories for fitting the approved scheme of fire-control into battleships and cruisers, had been completed. Similarly, in regard to torpedoes a new discharge of improved design had been introduced, with other arrangements to enable more rapid loading to be carried out. While a new torpedo, with increased range and speed, had been under trial.

This is a fairly extensive record of advance on the part of the attack in the never-ending conflict between weapons of offence and methods of protection. Obviously, too, it is only to a very limited extent that we see the result of the provision thus made in the marvellously improved shooting and marksmanship of the Fleet. Naturally, since—with one exception, to be mentioned later on—there has been no great development in armour, and that made by the Krupp process still appears to hold its own as applied to warship construction, one would be led to expect either an increased area of armour protection or thicker protection on the area armoured. It will probably be found, indeed, that both at home and abroad modifications have been introduced in the design and the internal arrangements of the ship in order to add to the precautions for keeping her afloat, while armour is being concentrated for the protection of the guns, their crews, the directing power of the ship, and those who control the firing.

It is in view of the many interesting developments in all departments which are thus indicated that it has been thought necessary to restore to the *Naval Annual* this section on Armour and Ordnance. It may, in fact, be said that the subject is of exceptional importance at the present time, when there are signs, manifest and pregnant, of a

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new era in warship production and equipment, of which the following are the three principal predisposing causes:—

(1) The lessons of the late war between Russia and Japan,
(2) The general acceptance of the principle of the Dreadnought design, and
(3) The prospective increase on a large scale of the Navies of several of the foreign Powers.

It is the last-named which makes it certain that this country must soon embark in a larger shipbuilding programme in order to maintain the relative strength of its Fleet, thus increasing the strain upon our resources for the production of armour and armament, and these circumstances have influenced the decision to widen the scope of this section of the *Naval Annual*. It will not be confined, as has hitherto been the case, to the development and advance in ordnance and armour, but be indicative also of the resources of the private manufacturers for the supply of warlike material. In other words, it is proposed to deal more broadly with the subject, to be more descriptive than critical, and as informative as possible under the restrictive conditions already mentioned. It is believed that by treating the subject in this way a good deal of information may be brought together which should be useful to students of naval progress, without in any way revealing secrets or divulging facts the disclosure of which might be prejudicial to the public interest.

Private sources of supply.

In the *Naval Annual* for 1894, 1895, and 1898 a series of articles was published upon our naval reinforcements in war time, and our supplementary resources for the supply of war material. In those chapters some valuable and interesting facts were brought together for the first time, enabling those not in the possession of official data to realise and judge for themselves of the wide interests involved, the immense resources at call, and the very large amount of capital embarked in these industries. An insight was thus given into the causes which have enabled this country in the past, and should help it in the future, to maintain the lead in all that relates to the maintenance of the essential factor of our Imperial existence, our supremacy at sea. The facts and statements in this article have been obtained in a similar manner, and are founded mainly upon inquiries made among the manufacturers themselves, the managers of all the principal establishments having most courteously replied to a request for information. The advantage of thus receiving information from those who are fully conversant with all the technical and scientific questions involved is obvious. It should be stated at the same time that the sequence in which the various firms are mentioned must not

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be construed as an indication of their relative capabilities. The order in which they have been dealt with is entirely a matter of convenience in arranging the form and construction of the article. For similar reasons the whole subject has been treated in one chapter, instead of, as formerly, dealing with ordnance and armour under separate heads; nor have torpedoes, mines, and other matters cognate to the inquiry been judged beyond its scope.

As was stated in the *Naval Annual* for 1906, the most striking change in the armament of battleships and armoured cruisers has been the suppression of the medium battery in the more recently designed vessels. It must be manifest to all who have made inquiry into the subject that what has been called the all-big-gun principle has been practically accepted by nearly every nation as the primary feature in new designs. The simplification of armament thus being brought about is partly due, no doubt, to the lessons learnt from the naval war in the Far East, and the confirmation afforded to previously expressed opinion that naval engagements in future will begin at ranges which but a few years ago could not possibly have been productive of decisive results. But another reason—and one probably of even greater weight—which has operated in bringing about this result is the further investigation which has taken place concerning the problem of the control of effective fire and the improvement in the systems for indicating and transmitting change of range. The attention, indeed, which has been given to perfecting the sighting gear of all guns, and to facilitating the methods of controlling fire, quite equals the efforts made by the gun-makers to obtain an increase of power and the rapidity of effective discharge.

Gun-power of battleships.

Since the advent of the Dreadnought, all the British armoured ships under construction have been given only one calibre of principal gun as their primary armament, whilst the secondary battery consists of guns of another and smaller calibre, intended for protection against torpedo attack. It is no part of our purpose here to review or discuss the controversy and criticism which this change of design has aroused. Not only the increased power of the guns, but the increase in the destructive range of the torpedo also, as well as improvements in sighting, have all contributed to enlarge the distance at which actions will be begun and fire opened, thus limiting the effective use of all the smaller calibres of ordnance. Moreover, it is evident that even at the shorter ranges, at which these guns have the greatest efficiency, the destructive power of the larger calibre weapons will also be more decisive. On the other hand, there are those who contend that the medium armament has not thus lost its value, and that its deprivation is not counter-balanced either by improved

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efficiency of control or by alleged advantages obtained in other directions. Nor is it without significance that this view appears to obtain abroad, and has influenced the design of some of the later foreign ships. The French vessels of the Danton class are to carry four 12-in. and twelve 9·4-in. guns as their principal armament. The 12-in. gun with which these vessels are to be armed is said to be an extremely powerful gun of 50 calibres, firing a heavier projectile (1000 lbs. as against the 750 lbs. of the 45-calibre gun), and having a muzzle velocity of 3035 f.s. This gun may be compared with the 12-in. gun of 50 calibres, lately adopted for the British Navy, which, with a projectile weighing 850 lbs., has a muzzle velocity of 3010 f.s. The French 9·4-in. is also reported to have been recently adopted, and to throw a projectile of 485 lbs., but no information is available about the striking energy and penetration of these guns. From the 9·4-in. a drop is made to 3-in. quick-firers, of which sixteen are to be carried as an anti-torpedo armament. This is similar to the calibre of torpedo armament of the Dreadnought, for which a heavier gun is to be substituted in later vessels. No definite information is available about the German Dreadnoughts, but it is believed that the primary armament will consist wholly of 11-in. guns of 50 calibres, firing a projectile of 740 lbs. Mention has, however, also been made of a new Krupp 12-in. weighing 51 tons, and using a projectile of 981 lbs. The secondary armament of the German ships is believed to consist of 3·4-in. weapons, approximating in power to our 4-in. quick-firers, and if this report be true the Germans would appear to have definitely adopted the all-big-gun type of armour-clad. In America the Delaware and North Dakota, which were authorised in June, 1907, are to carry ten 12-in. and fourteen 5-in. guns, and a similar armament has been proposed for the ships of the programme of 1908. The United States 12-in. gun of 45 calibres has a muzzle velocity of 3000 f.s. for its shot of 850 lbs., and the 5-in. gun throws a 60-lb. projectile. The same guns will, it is proposed, be placed in the vessels of the 1908 programme. In regard to this matter, Mr. Metcalf, the Secretary of the United States Navy, in his annual report, says, in speaking of the foreign Powers: "The armament of the latest type of battleships is composed of heavy turret guns and of smaller guns intended for defence against torpedo craft. The latter, moreover, are increasing in calibre to such a degree that in some ships of recent design they are of the same calibres that were used but a few years ago for the intermediate battery." He was probably referring to the Japanese Satsuma and Aki, which are armed with 12-in. and 10-in. mixed for the primary battery, and 6-in. and 4·7-in. as anti-torpedo defence armament. In the later Japanese ships it is

British and foreign Dread-noughts.

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reported that the principal armament will be of one calibre, and that 10-in. guns were used in the earlier vessels in consequence of difficulties connected with the supply of the armament of the heavier type at the time of the war. In any case, there are many naval officers who contend that from the point of view of control of fire, a mixed battery of 12-in. and 10-in., or even 12-in. and 9·2-in., gives practically the same results as a battery of one calibre of gun only. In the ships projected for Russia, Italy and Austria, the all-big-gun principle seems likely to obtain, but no authoritative information is procurable. The Russian ships will, it is stated, carry ten 12-in. guns, the Italians eight of the same calibre, and the Austro-Hungarian vessels a similar armament. The determination of Austria to build Dreadnoughts, if the statement to this effect prove true, deserves special attention.

Armoured cruisers' gun-power.

In regard to projected armoured cruisers, the all-big-gun principle is also reported to have been followed, although the latest vessels afloat carry uniformly a mixed battery. The Gneisenau, of Germany, has eight 8·2-in. and six 6-in.; the Rurik, of Russia, four 10-in., eight 8-in., as well as a number of 4·7-in.; the Japanese Tsukuba class mount four 12-in., twelve 6-in., and some 4·7-in.; while the Kurama class carry four 12-in., eight 8-in., as well as some 4·7-in. weapons. Similarly the Italian cruisers of the Amalfi class carry four 10-in., eight 8-in., and sixteen smaller calibre guns; while the Austrian battleships of about the same displacement are armed with four 9·4-in., twelve 7·5-in., and twenty-eight smaller guns. If the reported armament of the improved British Edgars be accurately described, these vessels will be an entirely new departure. Referring to this matter, it was remarked in *Engineering*, in its issue of August 9th, 1907 :—

> We are also promised a new class to correspond to the Edgar class of the Naval Defence Act. The Edgar class are of 7350 tons displacement, but we are promised higher speed than the 20·5 knots, a greater radius of action than with their 850 tons of coal, and a more effective armament than their two 9·2-in. and ten 6-in. guns. The Edgars are not armoured ships, but the new vessels must be, and, moreover, must have a much larger number of weapons of 9·2-in. calibre, and of greater striking energy than the two guns of this bore in the earlier vessels. We shall almost expect in these vessels a light, well-armoured type of Dreadnought commerce-protecting cruiser.*

In regard to the disposition of armament in the new Dreadnoughts of the foreign Powers, the method chosen for the original British design does not appear to have been followed in any case. It is true that no absolutely authoritative description of the disposition of the armament in the foreign ships is in the majority of cases available, and for the following statements it can only be said, therefore, that they are believed to be approximately correct. In the Dreadnought design, with the principal armament a broadside fire of eight 12-in.

* No cruisers of this type are proposed in the Estimates of 1908-9.

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guns is obtained, and a right ahead fire of six 12-in. guns. But the second of the two after turrets cannot fire right astern. It is understood that in the new ships of the Bellerophon group this turret will be raised so as to increase the right astern fire. In the French ships of the Danton type, only four 12-in. guns can be brought to bear on the broadside, but the fire of these four guns is supplemented by that of six 9·4-in. guns, and it has been claimed, therefore, that the French vessels have a more powerful broadside fire than the Dreadnought; the difference, however, in the penetrating power and resultant damage of the two descriptions of shell must be taken into consideration. The proposed American battleships of the Delaware type are to have ten 12-in. guns arranged in five turrets, the turrets being on the centre line of the ship, but arranged in such a way as to give a fire of ten guns on each broadside, four ahead and four astern. Two systems have been mentioned for the German ships of the Nassau type. One of these, about which there is much doubt, describes the ships as each having six turrets, two of which will each mount a pair of 11-in. guns, while the other four will each mount three 11-in. guns. These six turrets were to be arranged four on the centre line and one on each side as wing turrets. By this arrangement it would be possible to bring to bear the fire of sixteen guns on each broadside, eleven right ahead and eleven astern. But a more trustworthy report arranges the guns in seven turrets, two guns in each turret, the foremost turret and two after turrets being on the centre line of the ship, the second of those aft being arranged to fire over the other one. The other four turrets are placed, two on each side as wing turrets between the others. This arrangement will give a fire of ten 11-in. guns on each broadside, six right ahead and eight right astern. By this arrangement only fourteen guns are carried instead of sixteen as in the previous method. Differing again from any of the foregoing arrangements is that which is said to have been chosen for the latest Japanese battleships. Here the two wing turrets of the Dreadnought have been pushed further aft, and a second fore turret on the amidship section added. By this method the Japanese battleships will have a broadside of ten 12-in. guns, a right ahead and right astern fire of eight guns. It has been stated that the British battleships of the St. Vincent group are to have a somewhat similar disposition of the primary battery, with the exception that the two wing turrets will be placed in *echelon* instead of exactly opposite one another, thus giving a broadside fire of 12 guns, as well as eight ahead and astern. This is the arrangement which it is said has also been chosen for the twelve 11-in. guns of the German armoured

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cruiser "F." The Invincible class, it is understood, will have their eight 12-in. guns in four pairs, the two middle turrets being in *echelon* so as to give a fire of six guns ahead, six astern, and six on each broadside. From the above it would appear that all the nations, having acknowledged the necessity for largely increasing the broadside fire from the heaviest calibre of gun carried by their armoured vessels, are now endeavouring to increase their bow and stern fire, although it is not clear whether this is being done on some consistent principle or merely because of the desire of one designer to do better than the other. A fleet going into action in line ahead does not appear to have any need for overwhelming right ahead or right astern fire, and certainly it would appear wrong to sacrifice any broadside fire for this purpose. Such fire would have its use in chasing or in being chased. The great disadvantage seems to be that it necessitates an arrangement of wing turrets and thereby the loss of a certain amount of additional protection which can be given when the turrets are on the fore-and-aft line.

To what extent the teaching of the late war has affected the distribution of armour it is impossible at present to say, and certainly no one method of arranging the armour seems to have been adopted. The steel plates for warship construction are still made on the Krupp process introduced in 1895, or modifications of that process, although no big improvement appears to have been made in the quality of this armour recently. As regards the principle of application for protection, each country appears to have its own views. In the British Dreadnought and the later ships of her type the main belt is 11 inches thick, carried up to the height of the main deck, reduced at the ends to six inches forward, also carried up to the height of the main deck, and to four inches aft, carried up to a small height above the water-line. The barbettes for the 12-in. guns are also 11 inches thick. In the French ships of the Danton class the belt is 10 inches thick amidships, reduced to six inches at the ends, the arrangement of the armour being as in the Dreadnought, but reinforced by an extra strip of 2·5-in. armour fitted forward, up to the height of the upper deck, and by a 5-in. belt between the main and upper decks. The barbettes to the 12-in. guns, as in the Dreadnought, are 11 inches thick. In the later German battleships, the Nassau and her sisters, it is reported that the belt amidships is 12 inches in thickness, tapering to four inches at the ends. In these ships, at the extremities both forward and aft, the belt is only carried to a little above the water-line, and the armour is in no case carried higher than the height of the main deck, thus following the example of the Dreadnought. The barbette armour is here again to be 11 inches in thickness. In

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the American ships of the Delaware class the protection is thus described by the Secretary of the United States Navy:—

United States battleships.

"The hull is protected by a water-line belt of armour eight feet in width, whose maximum thickness is 11 inches, and whose cross-section is uniform throughout the length of the belt. This belt-armour gives effective protection to the boilers, machinery, and magazine spaces, and—most important of all for vessels of this type, whose centres of gravity are necessarily very high—affords, in connection with the casemate armour and extensive compartmental sub-division, a reasonable assurance of the maintenance of the stability of the vessel under battle conditions. The side above the main-belt armour is protected by armour 7 ft. 3 in. wide and a maximum thickness of 10 inches. This armour is likewise of uniform cross-section throughout, and in length is only slightly less than that of the main water-line belt armour. Above the main casemate armour amidships the side is protected by armour five inches in thickness, which affords protection to the smoke-pipes, the major portion of the secondary battery of 5-in. guns, and the hull structure. Suitable athwartship and diagonal bulkheads are worked at the extremities of the belt and casemate armour, and a protective deck of suitable thickness is provided throughout the length of the vessel. . . . With respect to the defensive qualities other than those dependent upon armour protection, the arrangement of the interior structure of the vessel is such as to give the maximum degree of protection to all vital portions by means of unusually effective compartmental sub-division, so that, in conjunction with the armour protection already noted, the defensive qualities of this vessel are believed to be distinctly superior to those of any battleship hitherto designed."

In the Japanese Satsuma the belt is nine inches amidships, reduced to six inches forward and to four inches aft, the amidships and forward portions being carried up the height of the main deck, and the after portion to just above the water-line as in the Dreadnought; but, in addition, there is a 7-in. armoured battery fitted from the main to the upper deck for protecting the 4·7-in. guns, so that the complete amidship part of the vessel is protected from below the water-line to the height of the upper deck by armour. The barbette armour of the 12-in. guns is eight inches in thickness. In the projected Russian battleships it is reported that the armour will be comparatively thick amidships, with but a small reduction in thickness at the ends, and the complete side will be armoured from about six feet below the water-line to the height of the upper deck, both forward and aft, the barbettes being approximately of the same thickness as the main belt. It will be noted that although there is a good deal of variation in the

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disposition of the armour in the various thicknesses, the trend of gun emplacement appears to be making in the direction of broadside fire from all the main guns, while in the cases of several of the more recent types the 4·7-in. or other secondary battery for defence against torpedo attack is not considered to be efficiently protected unless by armoured casemates of reasonable thickness.

Protective decks.

In all navies the horizontal protective decks, which were formerly of mild steel, are now being made of treated nickel steel, and generally a reduction in thickness of these decks has consequently taken place.

Hadfield's "Era" steel.

Reference was made in the *Naval Annual* for 1905 and 1906 to some remarkable results obtained by Messrs. Hadfield with cast-steel armour, to which the name of "Era" has been given. This material has been still further developed, and is now adopted by the Admiralty for the following vessels:—The Lord Nelson and Temeraire types of battleship, and the Minotaur and Invincible types of cruisers. Its use has been found advantageous for communication and ammunition tubes up to 40 feet or more in length; gun-houses, weighing up to 150 tons; director towers; conning towers; armoured hoods; and splinter-proof glacis plates; with many other purposes for naval and land service. For gun-shields, etc., wrought-iron and mild steel do not give sufficient protection unless in very thick or heavy forms and shapes, whilst the great expense attending the use of K.N.C. or K.C. armour otherwise than in a flat form is practically prohibitive; and as these materials are forged or rolled, the plates thus made have to be flat in at least one direction, and of equal thickness throughout. Chilled cast-iron has also been tried, but owing to its low tenacity and brittleness, in order to obtain sufficient resistance to the impact of projectiles, the thickness employed has to be so great as to practically prohibit its use for this purpose. On the other hand, "Era" steel has been found to possess the required combined qualities of resistance and toughness. It can be cast into shape, and is much tougher than even the mildest forged steel: it is cheaper than hard-faced armour, and being cast it can be produced in any required form, section, or profile. As regards its employment in shields and other forms, it is claimed for Hadfield's "Era" steel that it enables the material to be so distributed as to offer the greatest resistance and the most efficient protection at whatever point it may be struck. Thus in the case of a shield, at the front part, where most exposed to direct fire, the thickness would be greater than at other parts exposed to glancing fire, the thickness being gradually reduced so that equal but efficient protection is afforded at every part. This, together with the domed form, strengthening of apertures by beading, and the fact that there are absolutely no loose pieces such as bolts and brackets in its

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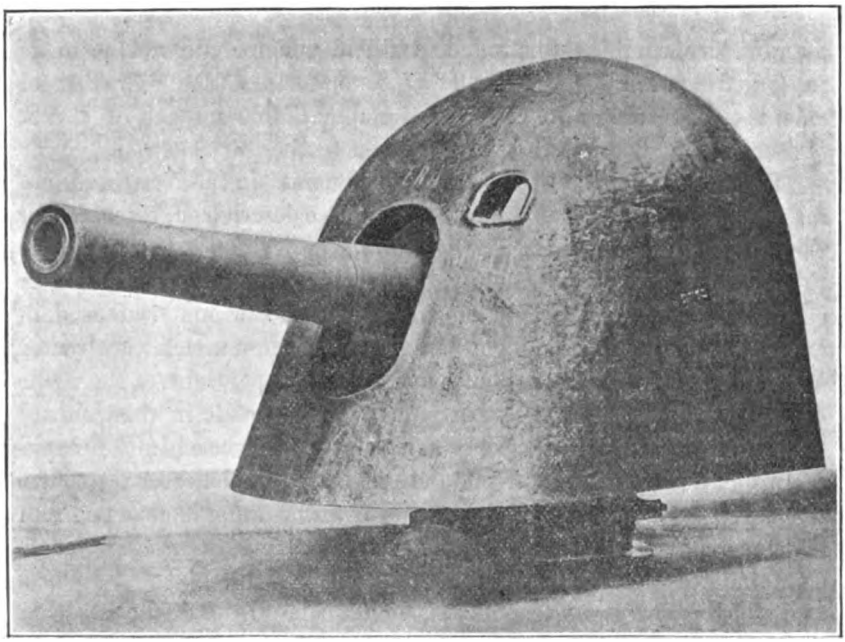
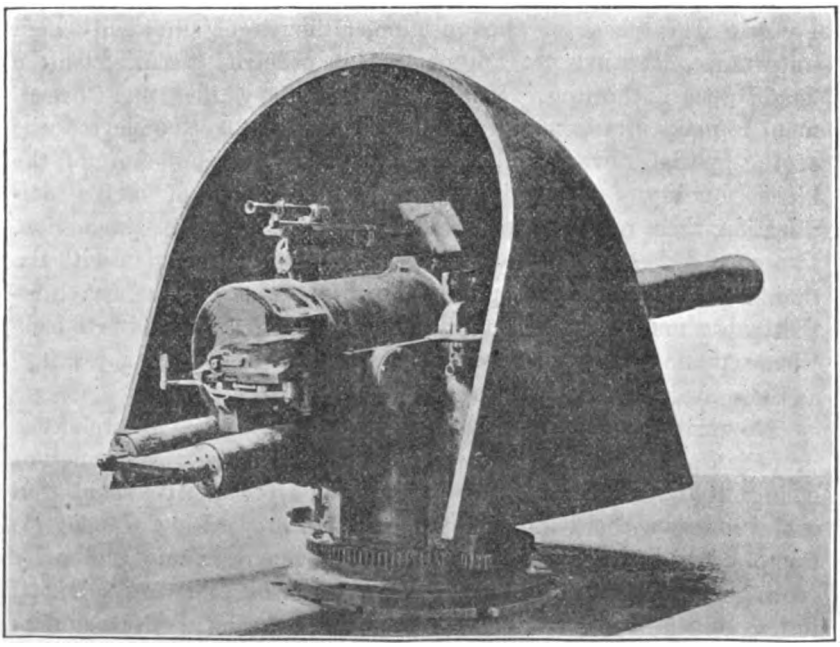


FRONT VIEW, INCLUDING THE MOUNTING.
Weight of shield, 9¾ tons.



BACK VIEW, INCLUDING THE MOUNTING.
Hadfield's Patent "Era" Cast Steel Shield for 6-in. B.L. Guns.

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manufacture, combine to produce a shield which could not be made in forged material. The results of some tests of the "Era" steel shields (illustrated on p. 275), and the remarkable impact resistance obtained with this material will be given further on.

Supply of raw materials.

In the article upon "Armour and Armament" in the *Naval Annual* for 1898 it was stated that before attempting to describe our resources for the construction of armour plate, guns and projectiles it was advisable to consider briefly what, if any, difficulties were likely to arise in connection with the supply of the steel and raw material used in the manufacture of the ingots from which these articles are made. While the iron which constitutes upwards of 90 per cent. of the whole could be—although for the most part it is not—made in this country from Cumberland ores, all the materials practically used in the manufacture of a modern armour-plate are imported in the ordinary course of trade. As a rule the stocks in this country are sufficient for from three to six months' consumption, based on the normal demand. Captain Tressider, who referred to this matter in the *Naval Annual* of 1905, also pointed out that nickel, which comes from New Caledonia or from Canada, and other necessary ingredients of armour, such as ferro-chrome and ferro-manganese—the latter coming from the Caucasus, Chile, Brazil and India—all reach us from oversea, and so are liable to be interfered with in case of war with a strong naval Power. This phase of the question, although of admittedly high importance, does not yet appear to have received attention at the hands of the authorities. It might be worth the while of the Government to make arrangements with certain firms to have bondage stocks of the special raw materials necessary for the manufacture of the highest quality of war equipment; otherwise, in case of foreign complication, there might be serious difficulties met with in production. It seems likely that these would occur chiefly in connection with the manufacture of guns and projectiles, since Captain Tressider states that plates manufactured from iron made from Cumberland ores have been experimentally tested, and have given "as good ballistic results" as those made in the usual way.

Propellants.

No great change appears to have taken place in the nature of the propellants used by different countries within the last few years, but owing to the serious accidents which have occurred in connection with storage on board ship, and particularly in regard to the deterioration of cordite, it has been decided to make arrangements for artificially cooling the magazines. Moreover, the regulations for the periodical testing of cordite have been made more stringent, with a view to increasing its safe age limit.

In all recent armament construction the endeavour has been to

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reduce the weight of material carried by the revolving turret, as well as to reduce the diameter of the protecting wall of barbette for the turret, and thus to effect a saving in weight of armour carried by the ship. In this connection a considerable reduction has been made in the diameter of the barbettes in the case of the Dreadnought type as compared with those of earlier ships, amounting to, in some cases, as much as eight feet. This is all the more remarkable considering the increased size and weight of guns carried by the Dreadnought, and is due in a great measure to the more economical arrangement of the guns and machinery, and the elimination of all unnecessary clearances between revolving parts and fixed armour. The size of the roller paths has been also reduced, notwithstanding the increased power in size of guns, and the heavier cages, slides, recoil, run in and out cylinders made necessary thereby. The energy per ton of gun has been greatly increased in the Dreadnought era as compared with earlier ordnance, and the higher muzzle velocity augmenting the stresses due to recoil has demanded, therefore, more careful attention to structural formations, but all conditions in this respect have been successfully met. Considerable improvement has also been effected in the appliances used for the transference of the ammunition from the magazines and shell rooms, and to the loading of the gun. These improvements have for their object both to obtain a higher rate of fire and also to prevent fatigue to the crew, by doing away with any necessity of handling the heavy charges, as it is obvious that a high rate of fire can only be maintained by preventing too great a demand on the physical endurance of those who serve the guns.

Improvements in gun-mountings.

In this connection it may be mentioned that no handling of the ammunition is necessary with the latest arrangements of the Vickers' hoisting gear for 12-in. guns, from the time the projectiles and powder charges leave the shell rooms and magazines. In their system of rammers used for loading the guns, the operation of transfer of the ammunition from the hoist cage to the gun is greatly facilitated and manifestly lends itself to an increased rate of fire. In the earlier systems the ammunition when hoisted from the magazines was transferred from the hoist cage to the loading cage by hand power, but auxiliary rammers of the three-ply type are now used for the purpose. The loading rammers of the chain type have become to a great extent the standard pattern for 12-in. guns in the British Navy. For each gun the rammer is carried on a rear extension of the gun slide, and its chief advantage is that the operation can be performed at any angle of elevation, and whether the gun is in motion or at rest. It is thus possible for the loading to take place without hindrance to the other operations of bringing the gun on the target, and thus without loss of

Vickers' ammunition hoisting gear.

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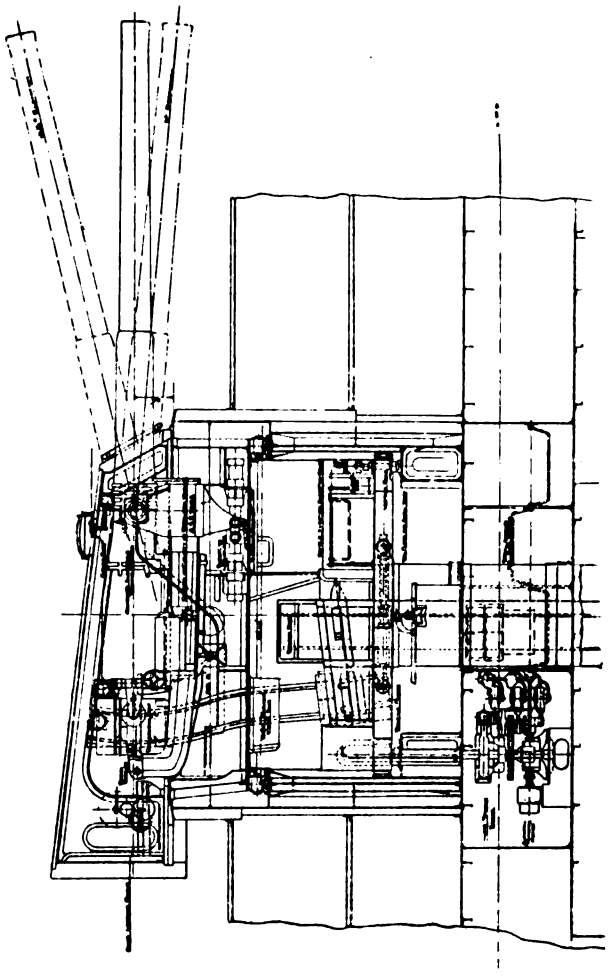
time for laying between the rounds, as the sight can be kept on the target while loading is going on. The guns do not require to be brought to some fixed stop each time for loading, as would otherwise be the case. The rammer is formed of a series of links, made on the same principle as a two-foot rule; each link is rigid in one direction, and when turned over will fold up. When extended the abutments of



VICKERS' BARBETTE MOUNTING FOR TWO 12-IN. B.L. GUNS.

the link keep the chain rigid, and prevent any downward sag beyond a predetermined amount. On winding the rammer back from the gun after driving the charge home the links are turned and form a flexible chain, which is stowed under the slide. The rammer is operated by a three-cylinder motor attached to the arm. An extension of the crank shaft, which is placed in a nearly vertical plane, carries a pinion

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which gears into a bevel wheel on the chain's sprocket shaft. Interlocking gear is fitted so that the chain rammer valve lever is locked, unless the cage is up against the stops on the loading arm. The cage cannot be lowered until the rammer is completely withdrawn. These rammers are shown in the illustration of the Vickers' barbette mounting for 12-in. guns on p. 278.

A great improvement influencing the rate of fire is the application of hydraulic power for operating the breech mechanism. The hydraulic breech mechanism, although introduced into ships before the Dreadnought, has undergone great improvement and operates very effectively and with great rapidity.

Vickers' system of air blast.

Another feature of considerable importance in connection with gun work, tending to improvements in the rate of fire and the facility of loading, is the Vickers' system of air blast for clearing the gun of smoke and residue after firing, and expelling the same through the muzzle. The air is introduced through a small orifice, projecting inwards from the rear end of the gun, immediately behind the obturating pad, and the apparatus is so arranged that the air will begin to issue into the gun automatically immediately the breech block is just clear, and will continue to operate while the breech is swung open. In some cases it is arranged that the action will be semi-automatic, as with the improved system of breech gear manufactured by the same company, the action of swinging the breech block is very rapid, and might not give sufficient period for the action of the air to clear the guns, and when this is so the air is arranged to be shut off by hand. This air blast system has proved itself surprisingly successful. No smoke of combustion is visible in the turret even after a considerable number of rounds, thus permitting the turret to be entirely enclosed, without the air holes at one time usual in the roof-plates of the shields or turrets. Only a small admission of a few seconds is sufficient to clear the gun at each round. The compressed air for the system is carried in the revolving turret in air flasks, which can be charged periodically from the ship's air-pressure system. The air is connected from these flasks by suitable flexible pipes to the automatic admission valve attached to the breech of the gun. This system of clearing the guns is now very extensively employed for all medium and heavy ordnance in the British Navy.

Holmstrom breech mechanism.

Much attention has been directed to breech mechanism, and we are enabled to illustrate (p. 280) a new type now being manufactured by the Coventry Ordnance Works, Ltd., a firm of which we shall have more to say presently. This breech mechanism is of the parallel obturator type, with the withdrawal movement, for which it is claimed that it is more theoretically correct than the steep cone variety. The

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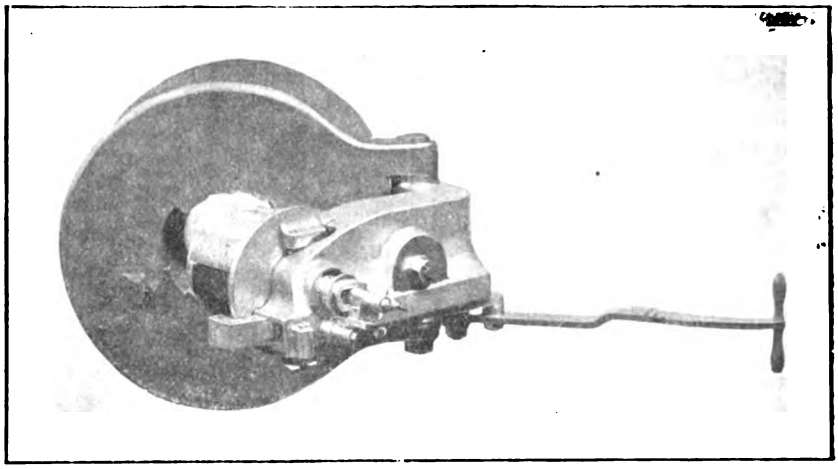
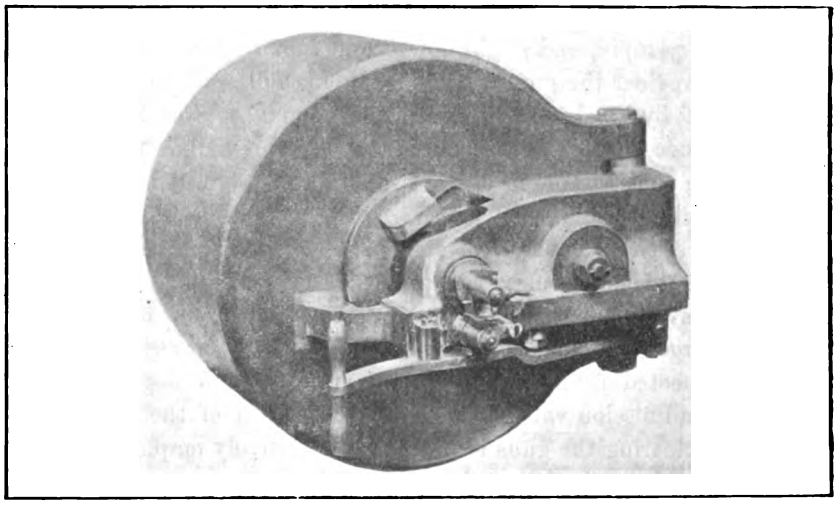
mechanism is known as the Holmstrom Parallel Obturator B.M., and the principal feature of the mechanism is that the withdrawal movement of the breech block after unscrewing is affected by a system of compound toggles, which act in recesses, cut in the top and bottom



BREECH OPEN.
Holmstrom Parallel Obturator Breech Mechanism.



BREECH CLOSED.
Coventry Ordnance Works Special Breech Mechanism.

of the rear face of the screw, and practically give a straight line pull to the latter. It is said that with obturators of the steep cone type the principal difficulty experienced has been that after the obturator

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has fired a number of rounds in rapid succession it has been found to swell, and consequently trouble has arisen in closing the breech. Even with guns having hydraulic mechanism for actuating the opening and closing of the breech, latches have sometimes been found necessary in order to prevent rebound. The principal disadvantage of the parallel type, on the contrary, has been the liability to stick in the obturator seating, thus causing a difficulty in withdrawal. With the Holmstrom pattern a pull of 50 lbs. on the hand lever will exert a force of 3½ tons on the breech screw. No trouble whatever has been experienced in the Holmstrom mechanism due to the rebounding of the breech screw when slammed to, and this will be readily understood when it is pointed out that the instant the carrier comes against the breech face of the gun, the breech screw is released from the carrier and seats itself in the gun, helped on by its own momentum, whilst the carrier is effectually prevented from rebounding by an extremely simple arrangement which locks it to the gun at the very instant that the breech screw is released. A novel system of firing locks has been adopted for this mechanism, and it is claimed for these locks that they are smaller, safer, and easier to manipulate, and possess greater rapidity of action than any other yet designed.

Improvements in sighting gear.

The sighting gear, especially with heavy guns, has been recognised as a matter of the utmost importance. The sights used have become accurate scientific instruments, and are made with as much care as the best constructed chronometer. In the First Lord's Memorandum for 1908–9 it is stated that arrangements have been made to bring the sighting arrangements of all ships up to date. A method of making allowance for errors due to the temperature, wear of the gun, etc., has been adopted, and powerful telescopes are always used. We are able to illustrate (p. 283) a new system, designed by Messrs. Vickers, which is known as the "Follow-the-Pointer" sight. In this system the range and deflection are transmitted from the fire control station direct to the sights on the guns, thus facilitating the work of the sight setter. The sight is also fitted with calibration gear to compensate for loss in velocity due to wear of gun or temperature of charge. The following description of this system will be of interest:—

Vickers' "Follow-the-Pointer" sight.

"In modern warships it is very desirable to have some efficient means of communicating particulars of range and deflection, together with orders, from a control or range-finding station situated in some convenient position to the various guns. For this purpose two electrical systems have been arranged. In the earlier system the range or deflection is transmitted from the control station by an instrument operated by a handle, and provided with counter drums actuated by an electric motor, and is received at the guns by means of a

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combined instrument, also fitted with counter drums and actuated by electric motors, which work in synchronism with those on the transmitters, which has proved to be thoroughly reliable. The latest system possesses several important advantages over the earlier one. In it the range or deflection found at the control station is received directly at the sight. by electrically controlled pointers, which are rotated in front of the respective dials, and indicate the point to which the dials have to be set for such range or deflection, thus greatly facilitating the sight-setting. In addition, correction is applied automatically to the range pointer, to compensate for losses in muzzle velocity due to erosion to the bore of the gun or change in temperature of the charge. The sight is of the cross-connected type, and has large range and deflection dials placed on the left-hand side of the mounting. The electrically controlled pointer in front of the range dial is actuated by an electric motor which works in synchronism with the motor in the controlling range transmitter. The motor is carried in a watertight box pivoted on a bearing placed centrally behind the range dial. When the transmitter is operated it causes the pointer at the sight to move round to a position corresponding to the required range. The sight is now elevated until the index mark on the dial is brought opposite the pointer. At the same time a cam groove cut in the back of the dial gives a certain motion to a bell crank pivoted in the dial casing; the bell crank in turn gives the motor box and consequently the pointer a partial rotation by means of a connecting link, which may be secured to the bell crank at different distances from the pivot, the amount of movement of the motor box and pointer depending on this distance. Therefore, the sight has to be still further elevated to bring the index mark opposite the pointer, thus giving the necessary correction. The face of the bell crank arm is suitably graduated to indicate the position in which to fix the connecting link. A disc fixed to the face of the dial is graduated for ranges in the usual way, so that in case the electrical circuit is interfered with the sight may be elevated, using the disc with the pointer acting as the index, the calibration gear still automatically giving the necessary correction. The electrically controlled pointer in front of the deflection dial similarly is actuated by an electric motor working in synchronism with the motor in the controlling deflection transmitter. The range transmitter consists chiefly of a rotary controlling switch operated by hand, and an electric motor geared to a pointer, traversing round a dial on the front of the containing box. The dial is graduated similarly to the sight dial. The rotary switch controls the current to the motors both in the sight and transmitter, causing them to rotate with a step-by-step

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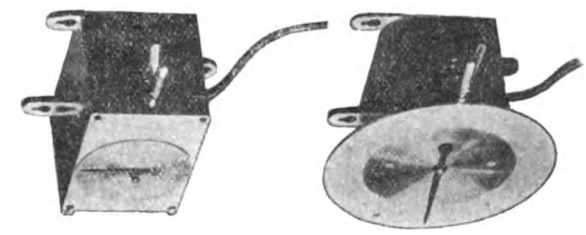

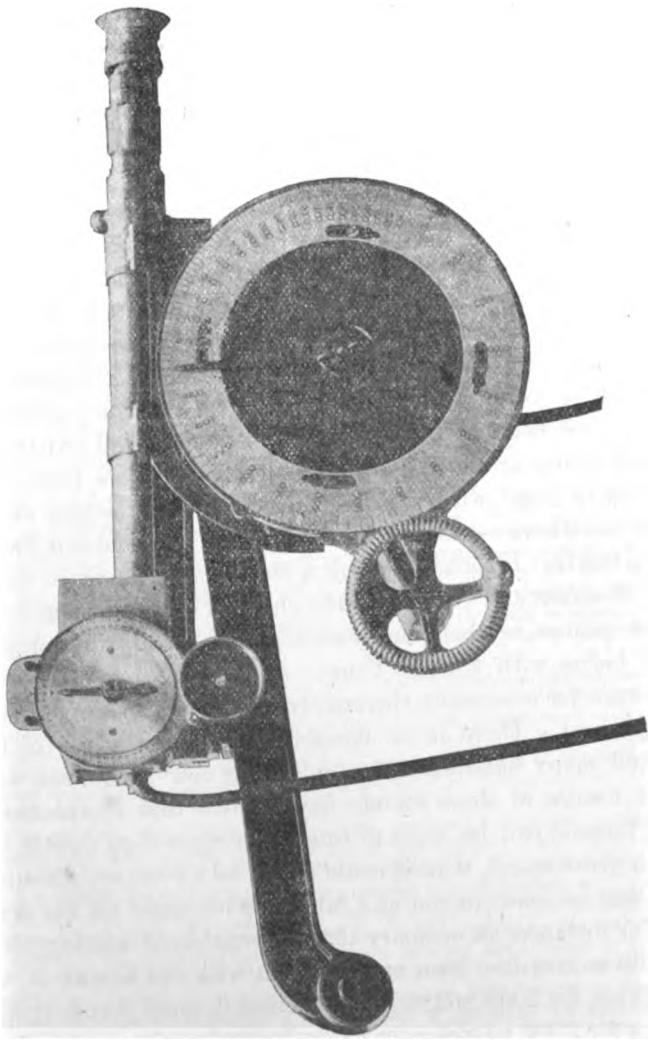

VICKERS' ELECTRIC "FOLLOW-THE-POINTER" SIGHT.
With Calibration Gear and Deflection and Range Transmitters.

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motion. On finding the range the handle is actuated until the pointer of the transmitter indicates the correct number of yards. The deflection transmitter is similar to the range transmitter, with the exception that the dial is graduated similarly to the deflection dial of the sight."

Increased range and speed of torpedoes.

Since the last issue of the *Naval Annual* considerable progress has been achieved in further developing the Whitehead torpedo. At the present time this weapon is of more importance to the Navy than at any previous period since its introduction, because when it was introduced it was intended to be used merely as an adjunct to the principal armament that at the time was fitted to either ships or boats, but now the torpedo is the principal armament of all torpedo craft, destroyers, etc., and is the only weapon carried by submarines. It is only natural, therefore, that with the large additions yearly of these vessels to the Fleet increased attention should be paid to the development of this weapon. Reference was made in the *Naval Annual* for 1907 to the *Times* report of a torpedo fitted with a new arrangement designed by Messrs. Armstrong, Whitworth & Co. for heating the air used to propel it. A further advance has been made in this direction. The principle of the new arrangement is, of course, well known—it heats the air to a high temperature before it is admitted to the engines of a torpedo, with the result that a great deal more work can be got out of it. The mechanism consists principally of two vessels, one containing fuel in the shape of petrol or paraffin, and the other being arranged for the combustion of this fuel. The latter chamber is fitted with a primer holder, and the action of the apparatus is as follows:—As soon as the torpedo is ejected and the air is turned on, the fuel is forced through a very fine nozzle fitted in the combustion chamber, and issues into the chamber in the form of a fine spray. The primer is then automatically fired, and the spray is ignited and burns with a fierce flame. Should the torpedo engines be stopped, even for a moment, the supply of fuel is also stopped, and the flame goes out. There is no possible danger in the use of the apparatus, and many hundreds of rounds have now been fired with it. The net results of these rounds have shown that by the use of the heater a torpedo can be made to run rather more than double the distance, at a given speed, than it could in its cold form, or, of course, the torpedo may be made to run at a much higher speed for the same distance. For instance, an ordinary torpedo capable of running 33·5 knots for 1000 mètres has been made to run with the heater at the rate of 35 knots for 2000 mètres, and whereas it could formerly run at 25·5 knots for 2000 mètres, it can now be made to run at 26 knots for 4000 mètres. A somewhat later torpedo, which gave 35 knots at

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1000 mètres and 27 knots at 2000 mètres, gave, after fitting with a heater, 36·5 knots at 2000 mètres and 42·5 knots at 1000 mètres. That this development is receiving serious attention may be gathered from an article entitled, "The Progress of the Torpedo," which appeared in the issue of *Engineering* for February 14th last. This article clearly sets forth the advantages obtained by the use of the superheater in torpedoes, and is of sufficient interest for us to quote:—

Recently we have placed on record the splendid results achieved by torpedo-boat destroyers, which realised speeds of from 33 to 35 knots, and now we have in a paper, read before the Liverpool Engineering Society by Mr. E. C. Given, convincing proof of the success of the submarine or submersible boat. All is thus well with the vessels which are to use the torpedo as a weapon of war; but when measuring the significance of the efficiency of these surface and submersible torpedo-firing boats, it is imperative that the efficiency of the torpedo itself should be considered. If the most effective weapon is not used, the best cannot be got from the boats. It is idle to increase the expenditure of a surface boat from £70,000 to £120,000, to get 34 knots instead of 30 knots, and at the same time accept a torpedo which has a speed of only 24 knots at 3000 yards range, when there is available a weapon of 32 knots speed at the same range, and particularly when other governments are adopting the new instrument. Modern naval tactics favour long range, and the torpedo which has a speed of 28 knots at 4000 yards range will be immensely superior to one of from 18 to 20 knots at such range. The advantage is correspondingly greater at shorter range; indeed, the formerly approved practice of fitting bow tubes to warships had to be discontinued because the speed of the torpedo-boat, and even the cruiser, was approximating so nearly to that of the torpedo itself. When, in 1886, the 125 ft. torpedo-boats could overrun the torpedo then available, the Mark IV. Fiume torpedo was introduced, and gave the necessary improvement in speed, but only for the short range of 600 yards. Some years ago the same difficulty of relative speed again arose, and the bow tube was abolished. The best torpedo in the Navy at 1000 yards range has a speed of only 35 knots, and at 1500 yards range 30 knots. Destroyers of 33 to 35 knots would thus overtake the torpedo they had fired ahead in less than two minutes; thus with low-speed torpedoes any attempt to fire ahead would be attended by serious danger.

Now torpedoes are available which have a speed of 43 knots at 1000 yards, and of 40 knots at 1500 yards, so that, if these were adopted, we could return with greater safety to the bow tube, which has great advantages. A destroyer approaching the enemy bow-on, alike in open sea or restricted waters, presents a much smaller target, can fire the torpedo more easily, and, reversing engines, can escape backwards more quickly. Thus it used to be a condition of the contract in some foreign navies—if not also in the British service—that a given astern speed should be realised on trial. The contingency that the charged point of a torpedo in a bow tube, being above water, was likely to be struck by a projectile scarcely holds, since above-water tubes are fitted elsewhere in the latest ships.

The splendid results achieved by the latest torpedoes, giving an increase in speed of about ten nautical miles per hour at all ranges, has been achieved by the application of air-heaters. It is now some years since the world was startled with rumours from America of the extraordinary results achieved by the Bliss-Leavitt apparatus for heating the air of torpedoes, and from that time the firm of Whitehead & Co. have devoted considerable attention to the investigation of this subject. Having taken over the patents of Sir W. G. Armstrong, Whitworth & Co., in connection with heating devices, they have succeeded in producing a heater considerably more efficient than was accredited by rumour to the Bliss-Leavitt. The heater consists of a small steel chamber between the air-vessel and the engine of the torpedo, in which a certain amount of liquid fuel is burnt in conjunction with the air passing to the engine, resulting in a gain in power of 100 per cent. as compared with the same engine and air-vessel when run cold. It is, however, in the extreme simplicity and safety of the Whitehead hot-air torpedo that its chief claim to superiority lies. The whole apparatus takes up only about 3 in. of the torpedo's length, and weighs about 12 lb. Details of construction are, of course, only known to the makers; but they are such that no difficulty is experienced in handling the torpedo by any man acquainted with this weapon. In order to show clearly the advantages which have been obtained by thus heating the air, the following table gives the speeds at various ranges of the latest Whitehead torpedo when run cold and hot; and, in this connec-

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tion, it may not be out of place to remark that the latest Woolwich torpedo does not equal the Whitehead as regards speed at any range:—

TABLE SHOWING SPEEDS OBTAINED BY THE LATEST WHITEHEAD 18-IN. TORPEDO.

	With Cold Air.	With Hot Air.
At 1000 yards	35 knots	43 knots
„ 1500 „	30 „	40 „
„ 2000 „	28¼ „	38 „
„ 3000 „	23 to 24 „	32 „
„ 4000 „	18 to 20 „	28 „

As we have already said, foreign countries are showing keen interest, and are acquiring torpedoes fitted with this heater; and at the present time the United States Government are obtaining these weapons from the Whitehead Company at Weymouth, whilst the Whitehead works at Fiume are extremely busy with orders from European Governments and some States of South America. At the present time, we understand, the British Admiralty has, so far, not followed the example of foreign countries. It is impossible for the Admiralty to long delay equipping the Fleet with the torpedoes so markedly superior to those of the Government's own construction, in view of the activity displayed by other countries in providing themselves with complete equipments of this weapon.

The importance of having the very fastest torpedoes available is great, not only on the grounds that the torpedo should at least be faster than the torpedo craft, but also because the errors which are of necessity present in practice with these weapons are very much reduced as the speed increases; and the possibility becomes more remote of the enemy avoiding a torpedo when its track discloses its progress. As the result of a large number of runs with the Whitehead hot-air torpedo at Portland, it was clearly shown that for steadiness of running, both for speed and direction, the hot-air torpedo is superior to the same torpedo when running cold; this superiority being more marked in cold weather, as after the water temperature has dropped to about 40° Fahr. it is impossible to run the ordinary cold-air torpedo. Thus every consideration establishes the great importance of the adoption of the new weapon, and until this is done the best cannot possibly be realised from the improvements achieved with our torpedo craft.

The unceasing work done by the naval architect and marine engineer to improve the craft, while the torpedo authorities seem to be standing still, can be easily demonstrated. One instance must suffice here. Our new destroyers, of 790 tons displacement, steam 34 knots for 11·36 tons of oil fuel per hour, and continue thus on official trial for six hours, while ten years ago the boats of limited capacity and radius of action, because of only 360 tons displacement, required eight tons per hour for 30 knots, and even then could only keep this up for three or four hours. The engine power has had to be trebled, and yet the weight of fuel used is only increased about 40 per cent.

The paper read by Mr. Given indicates that corresponding progress is being made with submersible boats. He deals with the vessels built for all Powers. In the British boats, which have increased in displacement from 120 to 500 tons, the surface speed has been augmented to the extent of about 75 per cent.—from 8½ to 15 knots—while the submerged speed has increased 30 per cent.—from 7 to 9 knots. It will be realised that great difficulties are associated with increase of speed, especially submerged. The power then utilised is electric, and the current must be stored in batteries. Thus, while the oil-engines used for propulsion, according to Mr. Given, weigh about 56 lb. per brake horse-power, the weight of the electric mechanism is 235 lb. per electric horse-power.

* * * *

No doubt the speeds will increase, and we shall at an early period have submarine-boats corresponding in speed to the battleships, with equal radius of action and good sea-going qualities. That being so, there is the greater need for an active policy at the Admiralty in connection with torpedoes, without which the submarine or surface torpedo-boats are practically useless.

Submarine mines.

The deadly nature of the submarine mine was proved beyond debate in the Russo-Japanese war, and it has now been recognised by every Power that it is necessary not only to be provided with a supply of this description of war material but to obtain experience

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with its use. Such improvements as have been made in the floating mine have been in the direction of rendering it safer to handle, while various arrangements have been introduced for the purpose of rendering the mines innocuous should they unintentionally get adrift. All the Powers also are fitting out special vessels for laying mines, and handling them generally when carrying out mining operations. The ideal vessel for the purpose should possess fairly good speed, large coal endurance, and a torpedo defence armament, with magazines for the mines and an arrangement for dropping them automatically as the vessel moves through the water. Additional attention has been directed to the subject owing to the opposition successfully offered at the Hague Conference to the adoption of any rule imposing restrictions upon the right of nations to lay mines according to their own judgment and inclination. No restriction is imposed upon the employment of anchored mines beyond a prohibition against laying them for the sole purpose of interrupting commercial navigation; while as to drifting mines, it was agreed that they must be so constructed as to become innocuous after the lapse of a certain period from the time when they were slipped from a ship or from moorings. With regard to the mine-laying ships, nearly all the Powers are converting older second-class cruisers for this purpose. In this country two vessels of the Apollo type, the Iphigenia and Thetis, have been fitted out as mine-sowers. Four other vessels have also been mentioned as likely to be brought forward for the purpose. In the United States the Navy Department has invited tenders for the conversion of two second-class protected cruisers, the San Francisco and Baltimore, and a destroyer, the Paul Jones, into mine-sowers. Similarly in France two second-class cruisers, the Cassard and d'Assas, are, it is stated, to be utilised for mine-laying work. On the other hand, in Germany, there are two special mining vessels, the Pelikan and Rhein, which are rather out of date, and these vessels have been practically replaced by the Nautilus and Albatross, specially constructed for this work.

The Elswick Company.

We may now turn to the result of the inquiries we have made in connection with the provision of armour and armament, and naturally the great firm of Sir W. G. Armstrong, Whitworth & Co., Ltd., which, since the days of the war with Russia, and even before the amalgamation with Whitworth, occupied the position of our principal supplementary arsenal, merits our first attention. The result of the revolution in armament brought about by fitting one calibre of principal gun on board all the armoured ships under construction has resulted in the guns of smaller calibre, such as 7·5-in., 6-in., and 4·7-in., being no longer required to anything like what was previously

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the case. On the other hand, a very much larger number of big guns than have previously been ordered are now required. These exigencies were foreseen at the Elswick Works, and large shops, suitable for turning out 12-in. turntables, were rapidly constructed, and were in full working order in sufficient time to meet the Admiralty demands. At the same time, new plant was purchased, reckoned so as to enable the company to turn out a 12-in. mounting within ten months of its being ordered, with its approved designs, and to continue delivery at the rate of one turntable per month. The effect of the alteration in the shops was very soon apparent. Three 12-in. mountings for the Dreadnought were ordered on December 30th, 1904, and were reported ready for trial on board the ship in the middle of September, 1906. The four turrets of the Indomitable were delivered within twenty months of the order, and the five turrets of the Superb will all be ready within twenty months of the order. Fourteen 12-in. turntables have been delivered in twenty-two months, besides eight 9·2-in. and twenty-two 7·5-in. turntables, for the British Admiralty alone. But perhaps the best idea of the accommodation which the firm have for the manufacture of 12-in. turntables is to be found in the circumstance that there were in February last 29 under construction in the works, and they were quite ready to take more. Every gun manufactured by this firm, from the 12-pdr. upwards, is now made on the wire system, and it is an interesting fact that when the Kashima left England for Japan about two years ago there was no less than 1000 miles of wire wound round her four 12-in. and four 10-in. guns. Energy and progress are the watchwords of the Armstrong Company. Increased rapidity of fire and improvements in sighting are constantly before their designers, and their efforts, combined with the wonderful results of drill and practice now carried out in the Royal Navy, are shown in the revolution which has taken place in the long-range shooting and gunnery efficiency of the Fleet.

New power transmission apparatus.

Mention has been made of the official announcement that designs of electrically-operated mountings for heavy guns had been worked out, and mountings of two different designs had been under trial. In this connection may be mentioned a special form of power transmission apparatus introduced by the firm of Messrs. Vickers, Sons & Maxim, which has given satisfactory results in its experimental stages. In this apparatus a body of fluid is employed to transfer the power from the driving motor to the driven element, and although it can be used with any form of prime mover, it seems to be specially suitable in connection with electric power. It is claimed for it that it can be applied to almost all the operations

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in connection with the working of guns and ammunition, but especially those connected with the training and elevating of ordnance. Where electric power is used it appears to overcome all difficulties associated with the control of this form of power. More or less trouble has hitherto been experienced with electric driving for the training and elevating of guns in connection with the control and regulation of the speed, and, perhaps, more especially in obtaining slow speeds and reversing. This has involved the use of special motor generators, so as to be able to vary the voltage at the operating motor terminals, introducing very complicated electric leads. In this new device the driving motor will run at a constant speed and in the same direction, a condition very desirable with electric motors; no reversing of the motor is necessary to obtain a reverse direction of rotation of the driven element, and any speed can be obtained from zero up to the *maximum* in either direction. The apparatus is simple, and the effort required to control it small; it can be controlled to drive so slowly that when applied to training gear the movement of the turret is imperceptible.

Hydraulic *versus* electric power for gun work.

The introduction of this new apparatus by Messrs. Vickers and the official trials just mentioned suggest some observations on the very important question of hydraulic *versus* electric power. The following remarks have been supplied to us on this subject by a correspondent fully conversant with all the facts and latest improvements, as well as of large experience in the technical and practical aspects of the subject:—

"The hydraulic system has many qualities which render it readily applicable to all the diverse operations connected with gun-mountings, and it may be stated with confidence that this form of prime mover is best suited for the various requirements in connection with heavy ordnance. There is, however, a growing conviction that it would be more expedient and economical if the hydraulic power plant could be dispensed with on board ship, and the electric installation extended so as to include the power necessary for the guns, as all ships must have electric generators, and no great difficulty would be experienced in arranging for the additional units necessary. But despite the very obvious advantage of having only one form of power to deal with, it is nevertheless of the highest importance that the system of power for working the guns should be thoroughly sound and trustworthy, and these qualities are present in a marked degree in the hydraulic system if well constructed, as compared with the electric form of power. The hydraulic system, also, is readily applicable to all the various operations associated with gun work. It is extremely easy to

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control and regulate, and, as compared with the electric system, the various controlling, cut-off, and safety devices are much less complicated. In the event of the fracture of the supply pipes the hydraulic system does not involve personal injury or danger; damage is at once visible by leakage, and can be easily repaired, whereas breakage of electric leads is not easily located, and may involve much trouble. Short circuiting, too, may have serious results on the electric generators or associated gear, and any element of uncertainty resulting from such unknown and undiscovered danger might, in action, be seriously demoralizing to the *personnel*. The motion of hydraulic engines and presses is practically silent. They can be worked so slowly that gearing can be dispensed with—a condition not possible with electric driving. In some cases the single-stroke motion of the hydraulic press is more suited to the work than the rotary motion of the electric motor. This is the case, for instance, with the ammunition hoist, and possibly also with the elevating gear and gun-loading mechanism. Hydraulic power is also a great convenience with heavy guns for running the gun out to the firing position after recoil. Electricity, however, is quite unsuitable for this purpose. With electrically-operated mountings it is usual to resort to spring or pneumatic power. Both these alternative methods are satisfactory, but they each involve additional weight, especially when springs are used. Moreover, springs are not so reliable as the hydraulic press, as they may fracture suddenly, and the difficulty of maintaining the pressure is an element invariably inseparable from the pneumatic system. Several columns of springs may be fitted, in which case the breakage of a spring in one column would not affect the run-out of the gun at small angles of elevation, and possibly at all angles, if there were a sufficient reserve of spring power; but the objection exists, and detracts from the trustworthiness of an essential part of the mechanism. For training heavy gun turrets hydraulic gear is undoubtedly the simplest and lightest.

"For the supply of ammunition to the gun by direct-acting hoists, hydraulic power is most suitable. It is extremely light for the load, has few working parts, is very accessible, and is little liable to go wrong. For hoists used in ammunition passages, where a quick continuous delivery is required, with automatic loading and discharging, either electric or hydraulic power may be used, but the balance of advantage is, perhaps, with the electric system. The same holds good in the case of revolving turrets for smaller guns, but here the question is chiefly one of convenience. If the ship is small, with few guns, electric power is preferred, as all ships have

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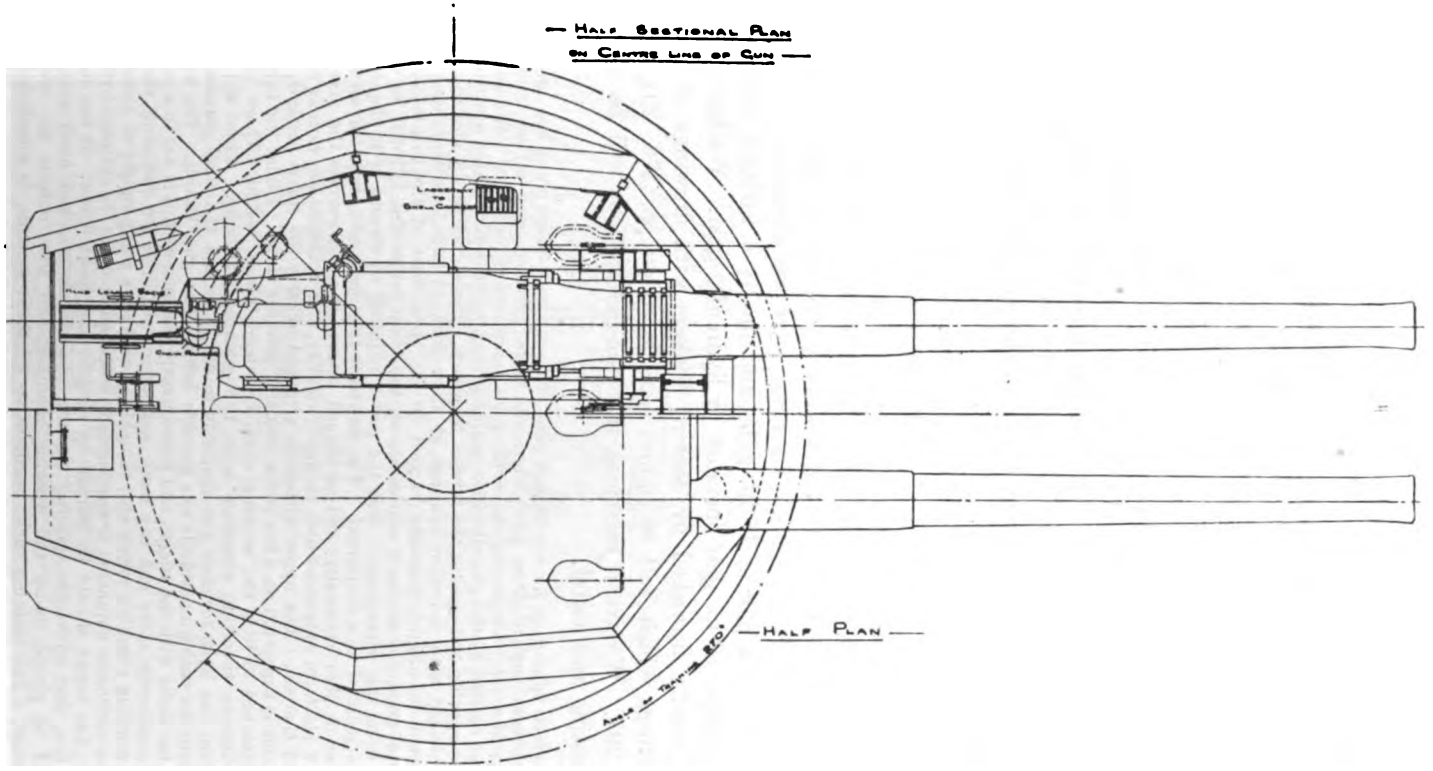

Vickers' Barbette Mounting for two 12-in. B.L. Guns.

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electric generators, and, except for gun work, need not have hydraulic pumps. These remarks are generally applicable also to elevating apparatus, where hydraulic power is preferable, as being most accessible for examination and overhaul. Where hand power is used in addition to machinery, the balance of advantage is still with the hydraulic system, as the parts are fewer and lighter. As regards the total weight carried by the ship, there appears to be no advantage whether for electric or hydraulic power, taking into consideration the water tanks, pipes, and the necessary water carried in the ship for the hydraulic system, with the one important exception that in the case of the hydraulic mounting the weights are carried lower down in the ship, as compared with the electric system, and this obviously affects stability."

Vickers' mountings for 12-in. and 10-in. guns.

In connection with the foregoing remarks, and the very decided opinion therein expressed, the following descriptions of three types of gun mounting, illustrating recent construction at the works of Messrs. Vickers, Sons & Maxim, will be found of interest. The first description is that of a mixed hydraulic and electric gun-mounting for a pair of 12-in. guns. Then we have an electrically-operated mounting for a pair of 10-in. guns, and finally a barbette mounting for a single 10-in. gun operated by hydraulic gear. We have been most kindly furnished by Messrs. Vickers with drawings of these mountings, which will be found reproduced on pp. 278, 291, 293 and 295. We trust, therefore, that the descriptions will be found interesting and useful.

Barbette mountings for two 12-*inch guns of* 45 *calibre.*—These guns are mounted on carriages supported on gun-slides, which are provided with all the necessary fittings to control the movement of the gun backwards or forwards. Mechanism is likewise carried by the gun-slides for ramming the projectile and charge into the gun, and for opening and closing the breech by power. For elevating the gun the slides are provided with trunnion bearings at their forward ends, the trunnions being supported on suitable brackets carried on the upper part of the turntable. The centre of gravity is as nearly as possible on the trunnion centre. It will be understood from this arrangement that the power required to elevate or to depress the gun is reduced to a minimum. The turntable is a plate and angle-bar structure, circular in plan externally, and so shaped internally as to provide the maximum area of platform consistent with strength, rigidity, and access to the various fittings carried thereon. The upper surface is arranged to carry the turret armour. The turntable is supported on a live roller ring and revolves on it. Under the turntable and attached to it is the working chamber, about 9 ft. in height. There is thus a two-storey revolving structure with two working platforms. From the lower platform one hoist for each gun descends to the magazine and shell chamber, and one hoist for each gun ascends to a position behind the gun breech. The working chamber turns with the turret, and consequently the men within it are in a position to conveniently carry out any hand movements required for operating the gun. This working chamber forms also valuable storage for a ready supply of projectiles. In this particular mounting it was decided that, in addition to the ordinary hydraulic power, the turret should be trained by electric and hand power. It was decided, therefore, that hydraulic training engines, electric motors, and hand gear, etc., should be placed under the working chamber, and thus outside the revolving structure. The training rack, common to all three systems, is attached to the latter. The rack is attached to the lower part of the working chamber, an arrangement peculiar to the special conditions and not usually adopted.

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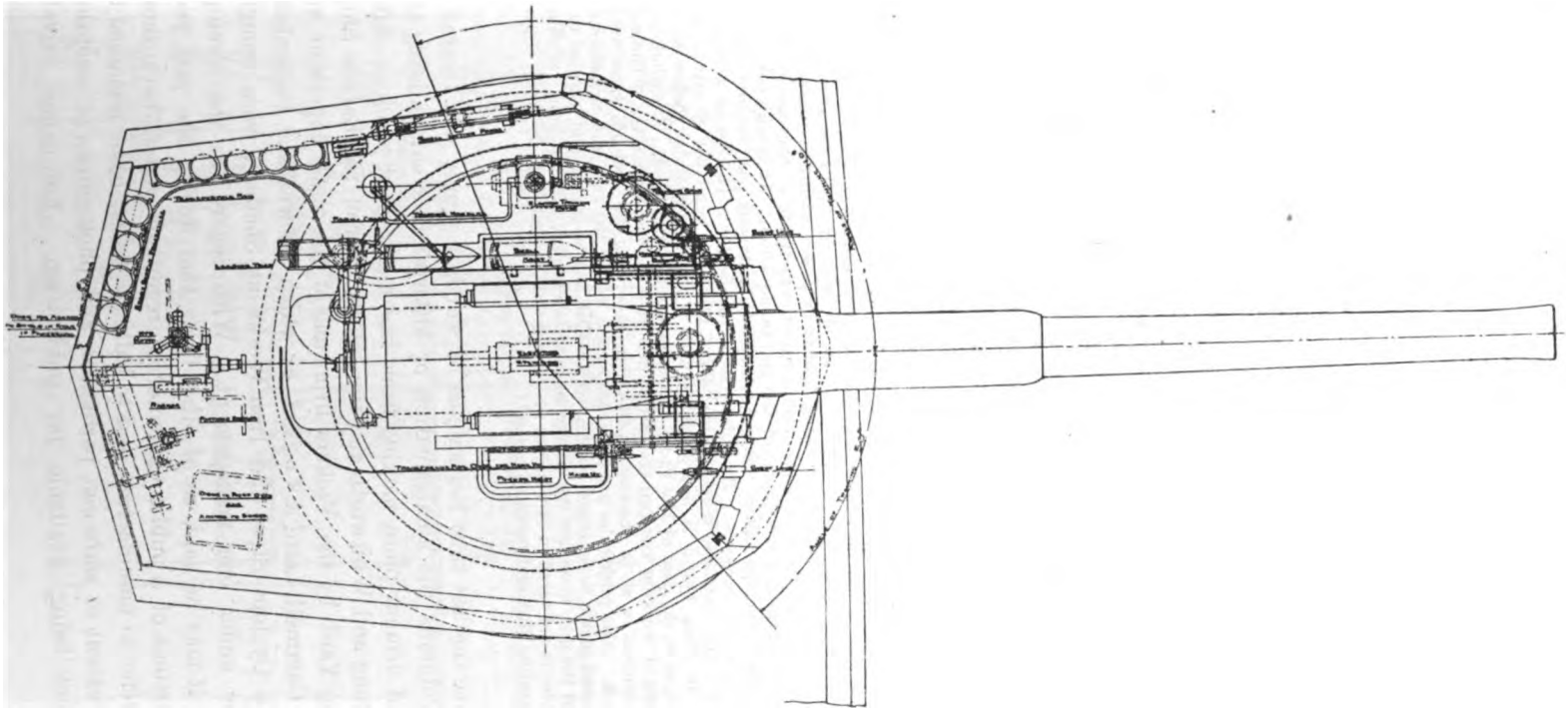

VICKERS' BARBETTE MOUNTING FOR ~~TWO 12-IN.~~ B.L. GUNS.

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Electrically-operated mounting suitable for pair of 10-*in.* 50-*calibre guns.*—In this case the diameter of the barbette is limited to suit the conditions of the design of the hull. It should be specially noted that this mounting is arranged for a high angle of elevation, and it was not, therefore, desirable to provide for the loading of the gun at all firing angles. The guns can be loaded in any position from 5° of depression to 7° of elevation. The rammers, carried on the gun-platform behind the loading cage, follow the motion of the gun through these angles, and the mechanism used will be described later. The guns are mounted in a similar manner to the two 12-in. guns already described, but, as electric power was adopted for carrying out all the power-worked operations, springs are used for running out the guns to the firing positions after recoil. The maximum firing angle being 35° of elevation, a very large amount of power is required. The turntable is of somewhat different design and construction to that for the 12-in. guns. Instead of being circular it is oval in plan, and the armour, instead of being carried on the top, is attached to the sides. This enables the diameter, height, and weight of the barbette to be reduced. On the other hand, the height of the vertical armour on the revolving structure is greater, and thus some of the saving in weight is lost. The other features of the turntable are somewhat similar to that for the 12-in. mounting; it has two storeys, but the hoists are arranged for one stage loading. The weight to be revolved is only about 300 tons, and all the training mechanism, both hand and power, is placed within the revolving structure; the hand gear is operated in the working chamber. Two sets of power training gear are used; the driving pinions, placed diametrically opposite to each other, gear into a rack attached to the supporting ring bulkhead. This bulkhead, which carries the lower roller path on its upper flange, extends down to the main deck, where it is supported independently of the protective armour surrounding it. The elevating gear differs from that for the pair of 12-in. guns. The 10-in. guns with their gear are so arranged that they may be elevated and depressed together by one set of controlling mechanism. Although this slightly complicates the mechanism the control is simpler, and the firing of salvoes may be more easily controlled from an external fire-control station.

Barbette-mounting for a single 10-*in. gun operated by hydraulic gear.*—The gun in this mounting is capable of being loaded by power within a limited range of elevation only, and thus the chain-rammer on the footplate of the rear of the gun-house accompanies the movement of the gun in elevation. At the higher angles of elevation, however, the chain rammer remains in its lowest position and cannot be used for loading purposes. By this system the barbette is kept of a minimum diameter. The turntable here also is made of plate and angle-bar structure, and is circular in plan, but it is not provided with a working chamber below the gun platform, as in the case of the 12-in. mounting already described. The whole of the operations of working the gun are carried out from the platform level. The supply of ammunition is, as in the case of the 12-in. mounting, by a central hoist working in a trunk. The projectiles are delivered to the left of the gun, and transferred by an overhead tackle to a hinged loading tray, which can be turned and inserted in the breech of the gun to enable the charge on it to be rammed into the gun. Similarly, the powder is delivered in two halves at the right of the gun, and, by hand, is placed on the loading tray and rammed home.

Cammell, Laird and Co.

Since the last time the subject of warship supply was treated in these columns the amalgamation or absorption of shipbuilding and gun and armour-plate making firms has made great strides. After Armstrong and Whitworth and the taking over of the Barrow Shipbuilding Yard by the Vickers firm, one of the more important was that of Cammell, Laird & Co., Ltd., by which the works at Birkenhead and the Cyclops Steel and Iron Works at Sheffield were brought together under one management. With regard to the Cyclops Works, it may be said, as of other firms, that during the past year all questions of a public character in regard to armour, both those which refer to manufacture and to ballistic trials, have remained to a great extent in *statu quo*, particulars and photographs of reception trials not being available for publication. But some private

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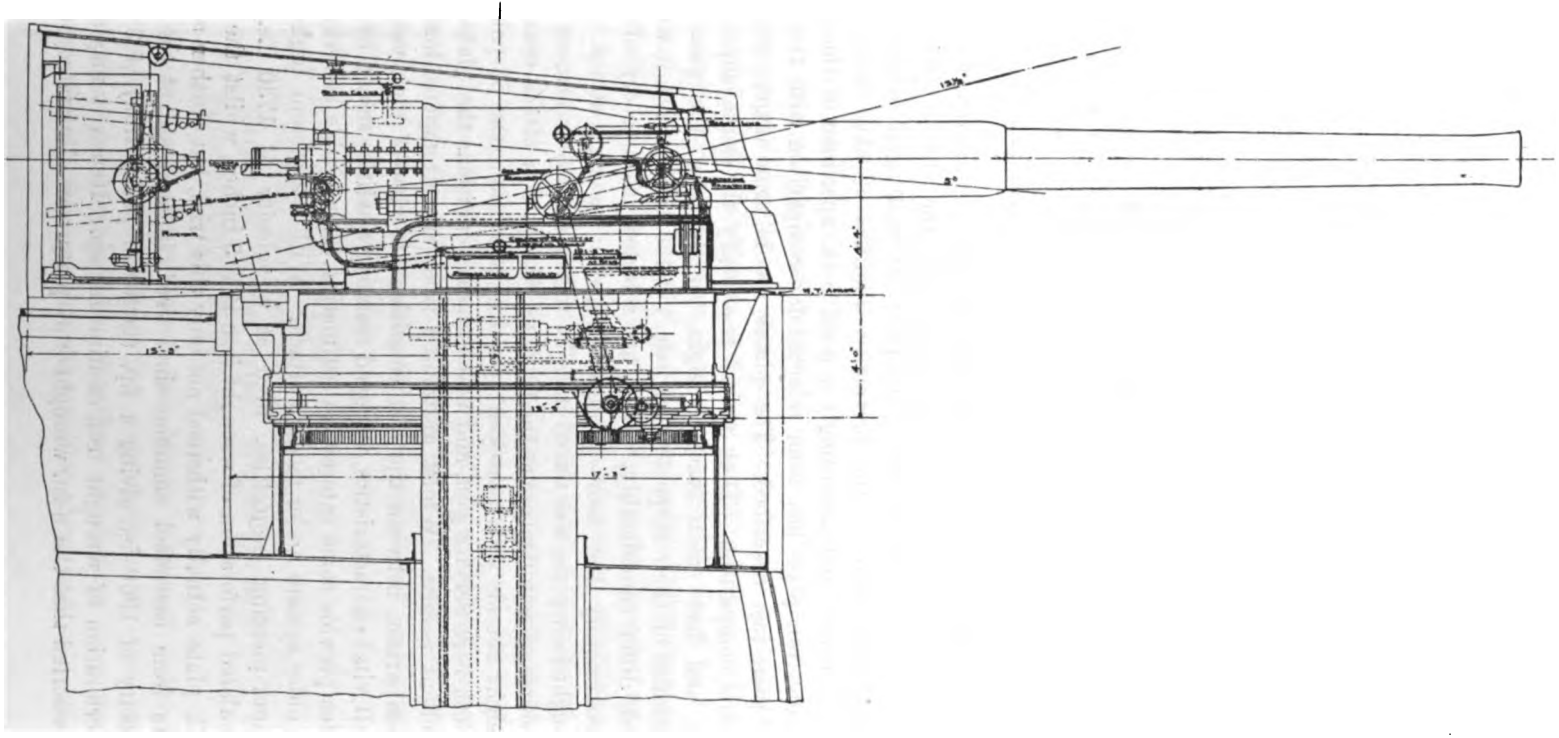

VICKERS' BARBETTE MOUNTING FOR 10-IN. B.L. GUN.

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experiments conducted on thin armour manufactured at the Cyclops Works some little time ago may be of interest. The plate in question was of Krupp cemented or face-carburised armour, 4 ft. 6 in. square, 3 in. thick, and was subjected to the following test:—

Round.	Description of shot or shell.	Striking velocity.	Striking energy.	Effect on projectile.
		f.s.	f.t.	
1	A. P. Shell	1550	516	Broken up
2	do.	1610	557	do.
3	do.	1670	599	do.
4	do.	1730	643	do.
5	do.	1730	643	do.
6	C. S. Common shell	1960	825	do.
7	A. P. Shot	1550	516	do.
8	C. S. Common shell	1806	701	do.

It will be observed that the plate stopped all the projectiles in a highly efficient manner, and in every case the shell or shot was broken up. Advantage may perhaps be taken to again demonstrate the advance made in the protective qualities of ship armour in modern times, and accordingly a good 8-in. specimen of the early wrought-iron plate has been selected for comparison with the 3-in. K.C. plate just described. The plates are in some degree adapted for this comparison. They are of practically the same superficial area, and have each received eight rounds from the guns and projectiles of their respective periods, but the thicknesses, it will be noted, differ considerably. They are selected as, in theory, offering approximately the same protection against modern attack. The wrought-iron plate was tested in 1874 to represent 8-in. armour then in course of manufacture at the Cyclops Works. The attack consisted of eight rounds with cast-iron spherical shot from the 68-pounder smooth-bore Service gun, and under these conditions the plate gave excellent results. Whilst abstaining from any attempt to institute a comparison between the test conditions, in view of their variance in all vital characteristics, the good resisting qualities shown by both plates provide some interest in estimating the probable behaviour of the older system under modern attack. With the present high-class armour-piercing projectiles, fired at a velocity of 1730 f.s., the calculated perforation of wrought iron is 7·5 inches, whilst the 3-in. K.C. plate actually withstood not only this trial, but further severe tests from cast-steel common shell fired, in one case, at the high velocity of 1960 f.s., giving a f.p. (factor of perforation) of 3·0, or a perforation of wrought iron of nine inches. Hence it may safely be asserted that the 8-in. wrought-iron plate now illustrated would

Wrought iron and K.C. plate contrasted.

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be perforated if subjected to the same attack which the 3-in. K.C. plate so successfully resisted.

Incidentally an improvement of bolting the armour to the ship's side is shown by the photographs reproduced on p. 298. In the iron armour it will be observed that the bolt holes were drilled through the entire thickness of the plate, whilst in modern armour the holes are merely drilled and tapped to the required depth in the rear of the plate.

Cyclops Works, Sheffield.

New armour processes necessarily entail considerable expenditure in plant, and, as Captain Tressider pointed out in the *Naval Annual* for 1905, the benefit to the armour-plate manufacturer himself of improvements in the material he produces is not very obvious. The 8-in. wrought-iron plates just referred to were manufactured in the original armour-mill at the Cyclops Works, but for plates of modern types Messrs. Cammell, Laird & Co. found it necessary to erect a new rolling-mill of 14,000 h.p., which is believed to be the largest of its character in existence. Improvements in guns and projectiles also necessitate improved machinery for the production of the forgings, etc., and consequently whilst the new rolling-mill has been erected for dealing with plates, Messrs. Cammell, Laird & Co., in order to provide the latest quality of material for the attack, have completed the installation of a new plant for the manufacture of projectiles of all descriptions, including armour-piercing shell of the highest quality. They have, further, erected two large new shops containing hydraulic, forging, and bending presses of 4000 tons and 3000 tons capacity respectively, making at the present moment eight presses in use at their steel-manufacturing establishments. These extensions facilitate the supply of large quantities of steel forgings of all descriptions for naval and military purposes, as well as for railway, engineering and general commercial requirements. Their resources for the manufacture of ordnance material and armour have been consistently augmented in order to meet any possible demand, and the actual capacity for this material may be summarised approximately as under:—

Armour of the latest type, 10,000 tons.
Gun forgings of all calibres, 5000 tons.
Projectiles of various types, armour-piercing, etc., of all calibres, 100,000 in number.

Generally it may be stated that Messrs. Cammell, Laird & Co. are capable of undertaking the manufacture of the armour, projectiles, gun-forgings, etc., for three battleships per year, in addition to the forgings, etc., for smaller ships and field artillery,

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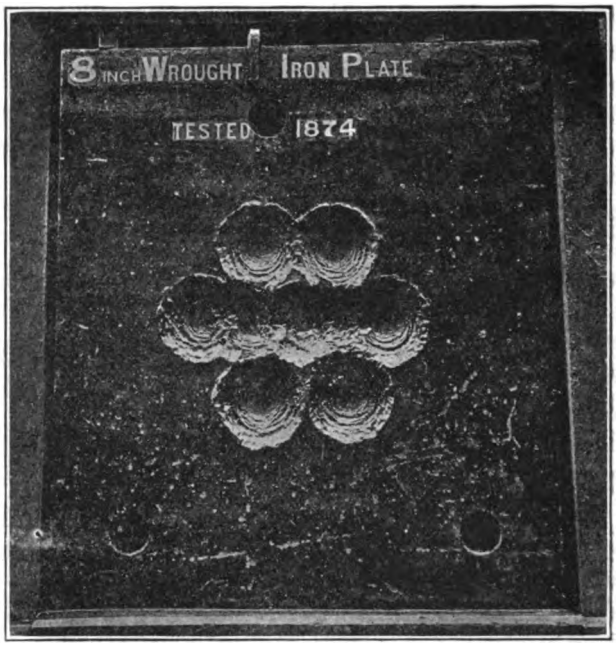
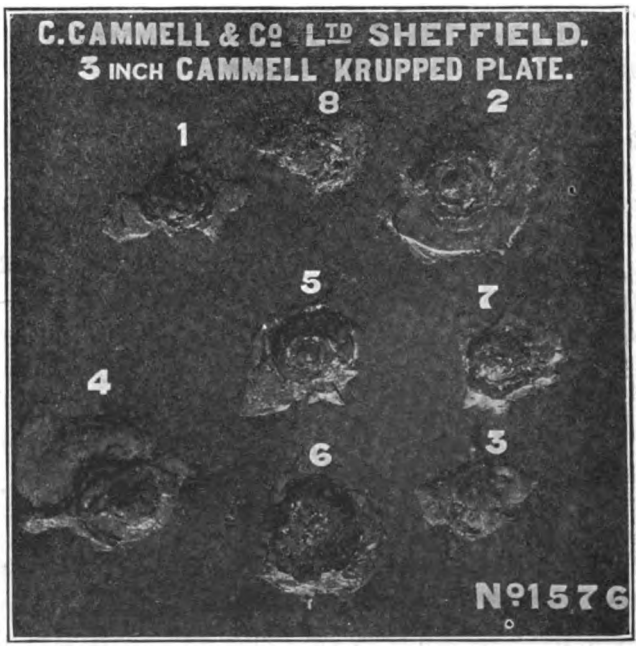


CAMMELL 8-IN. WROUGHT-IRON PLATE.
After attack with 68-pdr.



CAMMELL K.C. 3-IN PLATE.
After attack with A.P. projectiles and cast steel common shell.

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thus providing a large potential resource in times of national emergency.

John Brown & Co.

Another firm which in 1898 were only considered as armour-plate manufacturers, but which have since taken over the Clydebank Engineering and Shipbuilding Works, is Messrs. John Brown & Co., Limited. Their Atlas Works, originally established in 1854, is one of the largest and best known concerns engaged in the metallurgical industries of Sheffield, and at present covers an area of about forty acres. Of the various manufactures carried on at these works, two of the principal are those of armour and gun forgings. For the manufacture of steel there are eight open-hearth furnaces, the smaller ones being used for general work, while those of larger capacity, up to 50 tons, are entirely given over to the smelting of steel for armour plates and marine and gun forgings, experience having shown that better results are obtained, especially with delicate special alloys of metals, by using large furnaces, and thus obviating the necessity of mixing the products of several furnaces.

The manufacture of armour plates was begun by this firm in 1859 by the rolling of wrought-iron plates for the first armoured ships of the British Navy, and has been continued by the company through the successive stages of the evolution of armour. It has been almost exclusively confined for some years now to the Krupp plate, and the introduction of these later processes, with the numerous cementing and heating furnaces required, have necessitated the complete reorganization of the armour-plate plant. A few years ago, in order to meet the anticipated requirements of the Admiralty, additional plant was put down and the means of output practically doubled. The plant is very extensive and costly, and includes what is probably the largest hydraulic press in this country, exerting as it does a pressure of 10,000 tons. This press is used for pressing the ingots into slabs ready for rolling down to the required thickness in the armour-plate rolling-mill. A powerful new rolling-mill of 12,000 h.p. has just been completed. There are six shops devoted to the planing and general machining of armour plates, and these shops are equipped with nearly a hundred large machine tools of great power. The electric-driving system has been adopted for the machine tools, and also for the powerful cranes which have been provided in each of the shops. After being withdrawn from the carburising furnace, each plate has to be bent to the required shape to suit the lines of the ship, etc., and for this purpose a specially designed press of 6000 tons power has been erected. For dealing with the thinner armour there is a smaller bending press, with a total power of 2000 tons. This is a separate installation, and could

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be used for plates up to 6 in. in thickness. This company is in a position to supply armour at the rate of from 8000 to 10,000 tons of thick plates per annum.

Atlas Works, Sheffield.

The forging department is a very important one, and forging operations on a large scale have been carried out at the Atlas Works during the past twenty years. In 1887 the company laid down a forging press of 4000 tons power, served by two 150-ton overhead cranes. In order, however, to avail themselves of the extensive improvements effected in this branch of engineering, the company has recently established a completely new press department, embodying all modern accessories. Several recently designed lathes and trepanning machines have also been put down with very large electric driving power, to enable the firm to deal promptly with a large output of guns of heavy calibre, likely to be required in connection with their shipbuilding works on the Clyde. The boring machines are of massive proportions and suitable for all requirements in connection with gun-forging. The more recent installations at the Atlas Works include also a 6000-ton Harmet press for casting under fluid pressure. This system, known as trefillage, produces ingots of a much greater uniformity in analysis than any other known process, and therefore is especially suited for the manufacture of heavy ordnance, where steel of very uniform physical and chemical composition is essential, and it is felt that the large expenditure incurred in this plant is fully justified in view of the special industries in which the firm is engaged.

Beardmore & Co.

In August of last year, while the Channel Fleet was lying at Lamlash, Admiral Lord Charles Beresford, with a number of other officers of the Fleet, visited the Parkhead Steel Works of Messrs. William Beardmore & Co., Limited, and the naval construction works of the same firm at Dalmuir, on the Clyde. An excellent account of what the party was shown appeared in the *Times*, from which source, and also from information supplied by the firm, the following description has been compiled:—The firm of Beardmore & Co. have been associated with the Navy since the year 1861, when they manufactured the wrought-iron armour for the Black Prince of that date. What was then a comparatively small forge and rolling-mill has developed into a business which comprises all the plant that is necessary for the complete production of a modern battleship. At Dalmuir the ship is built and engined in a yard equipped with every modern improvement, and at Parkhead her armour and guns are manufactured. Examples of the firm's capabilities are to be found in the Berwick, Carnarvon, and Agamemnon, which they have recently completed, whilst their armour is used in the Roxburgh,

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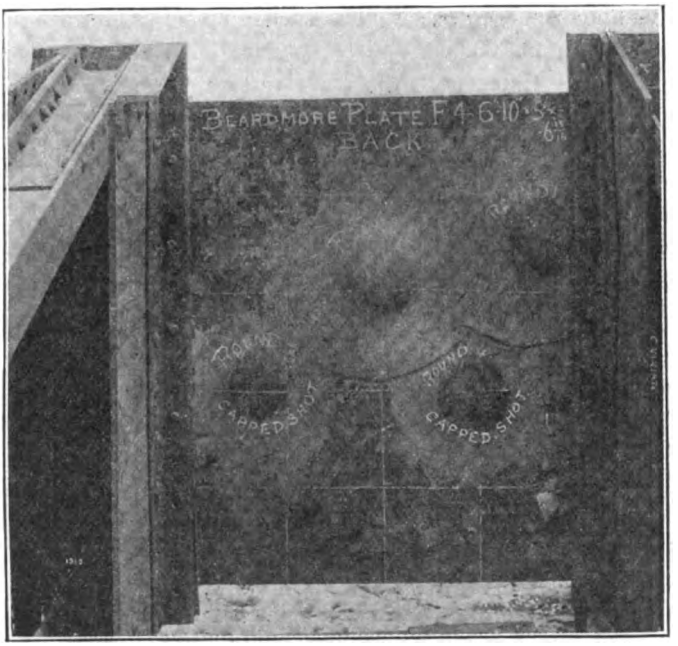
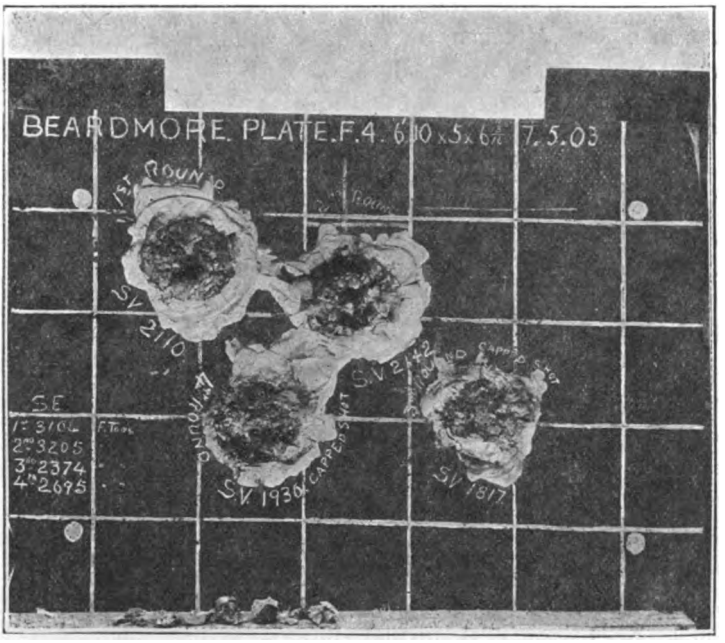


BACK OF PLATE AFTER ATTACK.



BEARDMORE UNBACKED PLATE AFTER ATTACK WITH CAPPED PROJECTILES.

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Cochrane, and Temeraire, as well as earlier vessels, and in numerous ships of foreign nations. Whilst the firm have been more or less continuously associated with the Navy in the manufacture of armour since the year 1861, and have passed successively through the wrought-iron, all-steel, and compound-armour stages, the production of the modern cemented armour dates from the beginning of 1890.

Parkhead Steel Works' armour-plate.

The following results of armour-plate trials will illustrate what the firm has done in this direction. In 1898 a 6-in. plate was fired at with 100-lb. Holtzer projectiles, with a striking velocity of 1960 f.s. Five rounds were fired at this plate, which measured 8 ft. by 6 ft., and in each case the projectiles were completely broken up and the soft, tough back ensured the absence of cracking. The Carnarvon, Roxburgh, Cochrane, and Warrior are protected with armour of this quality. In 1903 the firm submitted for test a 240-lb. 6-in. plate, 8 ft. by 6 ft., which was attacked with five 6-in. A.P. Holtzer projectiles, with striking velocities of 2126 f.s.; these were successfully kept out, with entire absence of cracking. In the same year a plate measuring 6 ft. 10 in. by 5 ft. by $6\frac{13}{16}$ in. was tested unbacked with capped projectiles having bursting charges, and successfully kept out a projectile weighing 104·7 lbs., with a striking velocity of 1936 f.s. The accompanying plates (shown on p. 301) illustrate this remarkable result. But what is believed to be a record success in 6-in. plates is illustrated on page 303. This is a plate 5 ft. square only, which was attacked by four 6-in. A.P. shot, with striking velocities up to 2252 f.s. All the projectiles were broken up and kept out; the effect on the back was very slight and there was an entire absence of cracking. As an example of what has been recently achieved with thicker plates, the following instance may be quoted. In 1904 a plate measuring 10 ft. by 7 ft. by $11\frac{3}{4}$-in. was tested by three rounds of 12-in. A.P. Holtzer projectiles, with a striking velocity up to 1864 f.s., the results equalling those of the foregoing 6-in. plates.

The firm have carried out a good many trials on curved plates, such as, for example, ammunition tubes, which they supplied to ships of the Russian Navy. Tubes of 6-in. cemented armour have successfully kept out 6-in. A.P. projectiles, striking with velocities up to 2020 f.s., the interior of the tube being uninjured. Recently a new quality of 3-in. cemented armour has been produced by the firm, and is now largely employed in British and foreign warships. Plates of this quality have successfully resisted the attack of 4-in. A.P. shell, with striking velocities up to 1926 f.s., and more recently a still further improved 3-in. plate has kept out 6-in. A.P. shell, with a striking velocity of 1850 f.s.—a remark-

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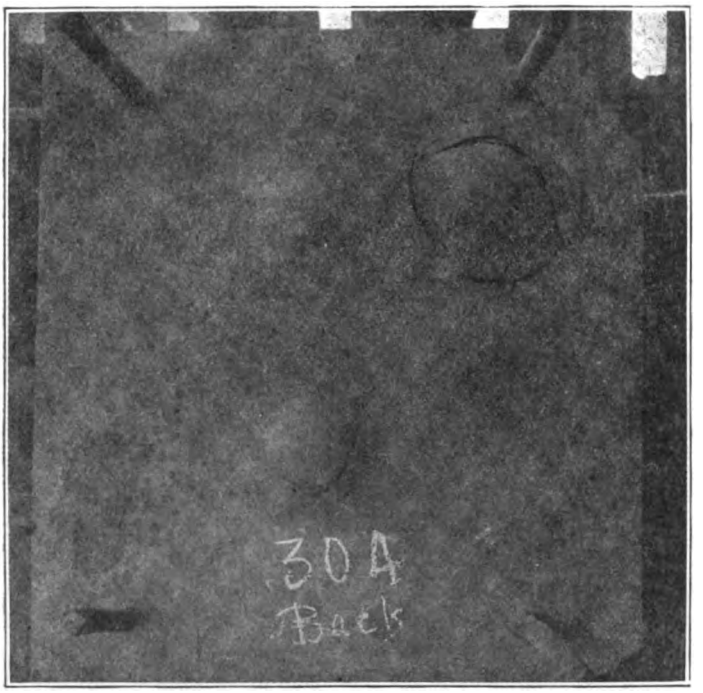
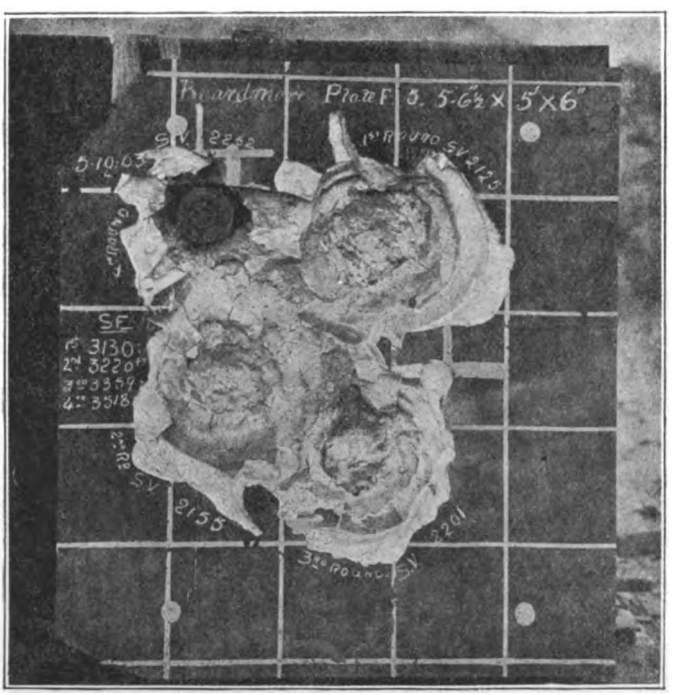


BACK OF PLATE AFTER ATTACK.



Beardmore 5-in. K.C. plate after attack by four 6-in. A.P. shot, with striking velocities up to 2252 f.s.

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able result. In the direction of resisting glancing shots, the firm have also supplied upwards of 2000 tons of a special quality of deck-plating to a foreign government. The tests required for this quality was that it should resist the attack of 6-in. A.P. projectiles, the plate being at an angle of 15° to the line of fire. The illustration (page 305) shows the result of the trial of one of these plates.

The annual output of armour from Parkhead has been as much as 4629 tons in 1903, but since that year the works have been greatly enlarged and are now able to turn out 10,000 tons annually. In March of this year there were 2460 tons being manufactured for the British Government, and 500 tons for a private firm. The plant for the manufacture of ordnance at Parkhead has only recently been completed, and though the firm has been supplying steel gun-forgings of all natures and sizes to the Royal Gun Factory at Woolwich for some years past, it is only this year that the manufacture of guns themselves has been initiated, the Admiralty having entrusted the firm with an order for 12-in. and 4-in. guns. The gun factory is equipped with machinery designed to deal with the largest nature of gun now in use or that is likely to be required in the future, and embodies every improvement which the experience of other great gun-making firms has shown to contribute to success in manufacture. The steel is produced under a system of fluid compression known as the Beardmore trefillage system, and its subsequent treatment is carried out in an installation second to none in size and completeness.

In the article in the *Naval Annual* for 1898, the following statement was made in the concluding paragraph :—

> In the foregoing statement of our resources one point can hardly escape attention, and that is the small number of firms engaged in gun and armour making as compared with the shipbuilders and machinery manufacturers. I am afraid it is hopeless to expect more from private enterprise in this direction, although from an official point of view doubtless the advent of more firms engaged in the construction of guns and armour would be hailed with satisfaction.

Coventry Ordnance Works.

Since the article in question was written private enterprise has, however, risen to the occasion, and large sums of money have been spent by private firms in extending their plant for the manufacture of armour plate, and a new ordnance manufacturing company has come into existence. This is the Coventry Ordnance Works, Ltd. This company has recently established works both at Coventry and Glasgow for the manufacture of all sizes of ordnance and all descriptions of naval and military gun-mountings up to the largest sizes in use at the present time, or likely to be used in the future.

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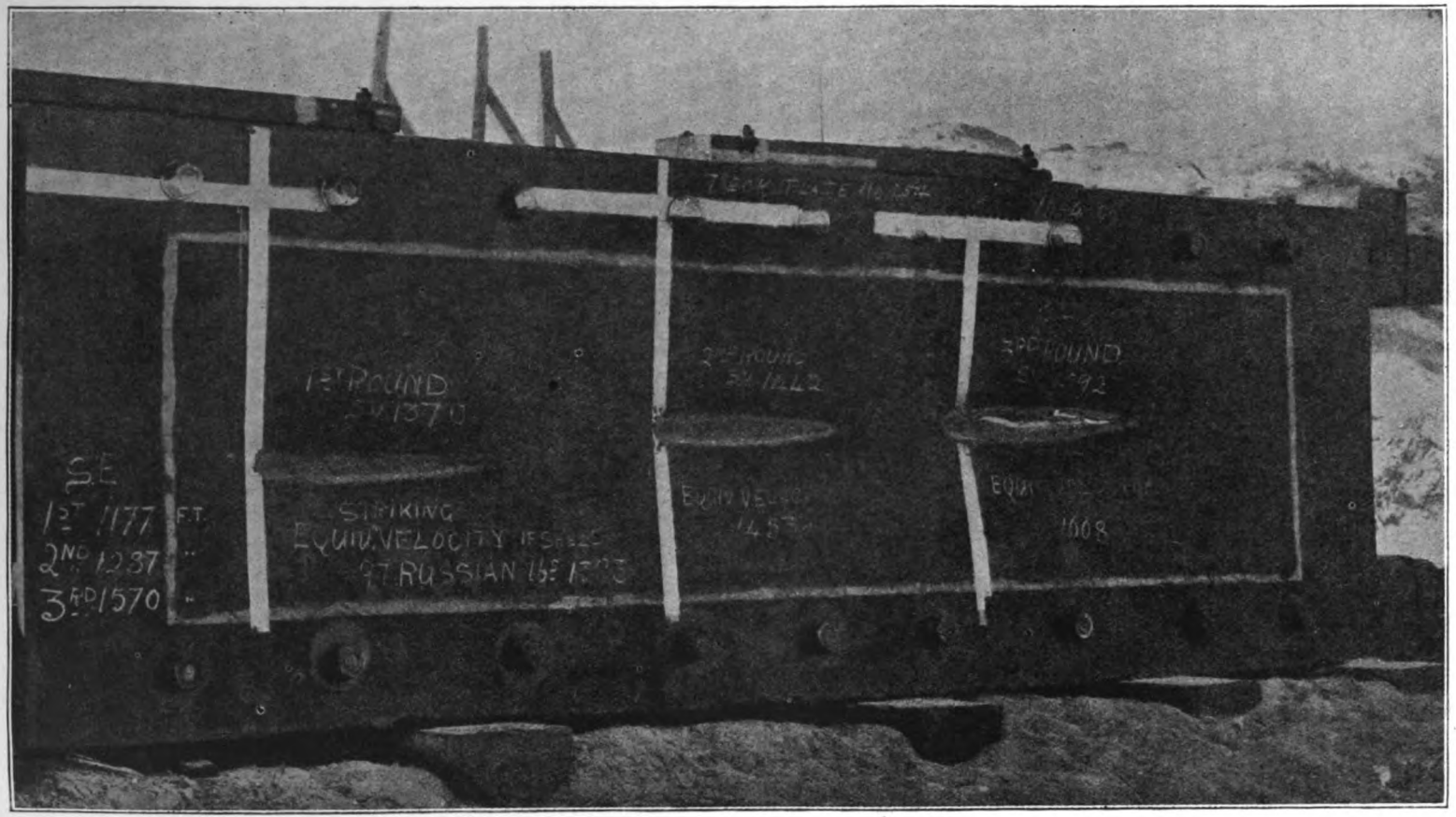

BEARDMORE DECK PLATING, AFTER ATTACK WITH 6-IN. A.P. PROJECTILES.

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The firm has establishments for the manufacture of ordnance, etc., at the following places:—

At Coventry, field, garrison and naval guns and breech mechanism; field and garrison gun-mountings; pedestal gun-mountings; hydraulic and electric machinery for use in naval mountings; cartridge cases for quick-firing guns; projectiles for quick-firing guns; fuzes, primers, and firing tubes; and transport vehicles for military purposes.

At Glasgow, armour shields for naval mountings; shield structures, turntables, working chambers, trunks and other plate and angle work as used in naval turrets; erection and testing of complete naval turret mountings.

At Cliffe, cordite and other cartridges; shell loading; and explosives magazines.

At Boston, gun-proving ground, 22,000 yards land range; and their designing offices for ordnance, mountings, etc., are at 30, Broadway, Westminster.

From the above it will be seen that small naval guns and mountings are manufactured and completed at Coventry ready for delivery, and as regards orders for heavy naval guns and turret mountings, the following are the arrangements. The guns and their breech mechanism with hydraulic or electric operating gear are manufactured at Coventry, as also are the whole of the hydraulic or electric machinery and appliances for elevating, training, and supplying ammunition. These parts are then sent to Glasgow, so that they may be fitted into their respective places in the turrets, which are erected complete over the fitting pits, and of which the company have five, each 36 ft. in diameter and 45 ft. deep. On completion, the mounting is connected up to the hydraulic or electric supply system, and all machinery is worked so as to thoroughly test every part with the guns in place. The next step is to detach the shield and ammunition trunk, and the remainder of the mounting, weighing up to as much as 150 tons, is then lifted by electric cranes and deposited on board ship. This can be done at all states of the tides, the company having excavated a large dock adjoining their main erecting shop on the Clyde. The Coventry works are equipped with the latest machine tools for the rapid manufacture of heavy naval ordnance, it being agreed that the most —or perhaps the only—important point in times of emergency is rapidity of output. Consequently the installation of machinery has been so arranged that the fullest possible advantage is made of the use of "high-speed" steel, and in certain cases the company have designed and built in their own shops high-speed lathes capable of

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boring and turning gun-tubes simultaneously; while in that portion of the works at Coventry devoted to the manufacture of parts of heavy naval gun-mountings a very considerable portion of the floor has been covered with heavy cast-iron plates, machined and laid so as to be dead true. On these plates are arranged large numbers of heavy portable machine tools, each containing its own motor, the idea being that where there are four or five operations on one large piece a considerable amount of time is saved if the work can be bolted down to the cast-iron flooring and the machines crowded round it, each performing simultaneously its own work. For example, two boring machines, three drilling machines, and one shaper can all operate on a 12-in. gun-slide fixed to the cast-iron floor-plates. While the use of these floor-plates and portable machines is not a new idea, yet the installation at Coventry is remarkable as being possibly of greater magnitude than that of any other in existence.

Equipment of shops for high-speed work.

The shares of the Coventry works are held by the three firms of John Brown and Co., Ltd., Cammell, Laird and Co., Ltd., and the Fairfield Shipbuilding and Engineering Co., Ltd. Consequently, the Coventry works are in a position to supply armament of any kind for ships of war built by the different shipyards for foreign governments, as during recent years it has become the practice for foreign governments to order from the shipbuilders not only the hull of the vessel, but also the necessary armour and armament. The Coventry works are able to obtain the necessary requirements in the way of forgings, armour plate, steel castings, and armour-piercing projectiles from the Sheffield firms just mentioned. It will therefore be seen that no firm has wider sources of supply. The works at Coventry, Glasgow, and elsewhere have all been so designed that they are capable of considerable extension without interfering with the work going on in the shops. It is a most difficult problem to fix the capacity of output of a heavy ordnance works, so much depending on the number of guns and mountings ordered at a time to one design. If the orders are so placed that as soon as one part is finished another similar part is ready to take its place on the machine or the erecting pit, then a very large output can be expected, but if, on the contrary, there is a period of waiting for work or alteration in the design the works will not be able to show such good results. At the present time the Coventry Ordnance Works could supply the whole armament for at least two ships of the Dreadnought class per annum in addition to a large number of smaller turret gun-mountings, but these figures could readily be doubled without interfering with the output of field guns, of which latter class of equipment the company have delivered over

Capacity of works.

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extended periods the constant supply of one battery of six guns per week, with the necessary carriages, wagons, limbers, ammunition, and fuses.

There is also at Coventry a model factory for the manufacture of all descriptions of fuses, and a very large proportion of the special tools of precision required in this department are manufactured in the company's own works. For the supply of cartridge cases for quick-firing guns the Coventry works have special presses and use special metals. The importance of the work carried out by the experimental department of an ordnance firm has not been lost sight of by the company. They have leased from the Crown a large area on the Lincolnshire foreshore of the Wash, over which they intend shortly to be in a position to carry out any artillery practice up to 22,000 yards range, as well as trials of armour-plates, A.P. shot or shell, etc. A valuable feature of the available area is that at one portion of the range the width is about three and a half miles, so that high explosive shell trials can be carried out under service conditions with safety. Although of comparatively recent conception, the Coventry Ordnance Works have been successful in securing orders from the Admiralty and War Office, and have had their designs of field and naval artillery accepted after protracted competition and exhaustive trials.

Thos. Firth and Sons.

We now come to the firms which have made a speciality of projectiles in addition to undertaking other branches of the manufacture of naval war material. Before the introduction of steel made by the Siemens-Martin open-hearth process, the firm of Thos. Firth and Sons, Ltd., Norfolk Works, Sheffield, had become closely identified with the manufacture of war materials. They were, in fact, the first manufacturers of steel for ordnance, and the material for the celebrated "Woolwich Infant" was made at their works, the ingots for the pieces each requiring about 1000 crucibles. They have also had a long experience in the manufacture of projectiles, their connection with this department of warship equipment dating from the days of the old round shot used in muzzle-loading cannon, and which were produced from crucible steel with the assistance of dies. The firm have since taken a leading part in all the succeeding stages of gun and projectile manufacture, culminating in the production of the heavy gun-forgings and the capped armour-piercing projectiles of the present day.

The various departments of the works of Messrs. Firth and Sons cover an area of about forty-one acres, and are capable of employing upwards of 2000 men. The bulk of the heavy forgings now made are manufactured from steel produced by the Siemens-Martin process.

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For the melting of this quality of steel there are the following furnaces, viz., one of 45 tons, two of 25 tons each, and one of 10 tons, with which ingots about 100 tons in weight can be produced. The firm have recently installed a complete plant for the working of the Harmet system of fluid compression, by which ingots possessing remarkable soundness and freedom from "piping," etc., can be produced. In the East Gun Works there are two powerful hydraulic forging presses, exerting a pressure of 3000 tons and 2000 tons respectively, and capable of dealing with the huge forgings required in the building up of modern guns. The total producing capacity of the works is upwards of 40,000 tons of steel per annum, and the manufactures comprise forgings for ordnance work, all classes of projectiles, torpedo air-vessels and ends, marine shafting and engine parts, forgings and castings for turbine work, crucible steel of the highest quality, special alloy steels, and all descriptions of railway material. At the present time important extensions are being carried out, an additional 21 acres of land having been acquired at Tinsley, near Sheffield, on which the erection is now practically completed of a crucible steel-melting plant, rolling-mills, etc., of the most modern type. Opportunity is also being taken to remodel the machine shops, and a new building has been erected at the East Gun Works, in which it is proposed to instal all the heavy machine tools, thus bringing them into close proximity to the forging presses, and facilitating the handling and machining of heavy forgings. The lighter lathes, designed and put down specially for projectile work, are also to be moved and brought within easy access of the shell presses, hammers, and hardening shop, thus tending to reduce the cost of production and increase the rapidity of output.

Messrs. Firth were the pioneers in the manufacture of projectiles in this country, and were the first firm to offer capped shot to the British Government, shortly after the Russian trials at Ochta in 1894. They were also instrumental, after long experiments, in introducing to the Government the well-known "Firth Rendable" A.P. capped shell, designed to carry a small bursting charge through a Krupp cemented plate of one calibre thickness, and to burst effectively on the other side. Recently the firm have occupied themselves with the manufacture of a new type of capped high-explosive shell, and at a trial in December of last year one of their 12-inch common pointed shell, fitted with cap, and carrying a bursting charge of about 9½ per cent. of its total weight, successfully penetrated a 9·2-in. K.C. plate. The British Government is still continuing its experiments with this new class of projectile, and further trials are to be made,

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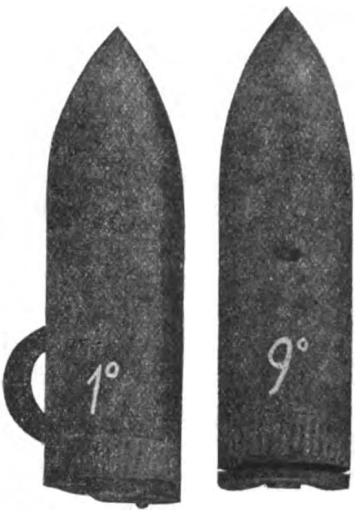
for which Messrs. Firth have been requested to supply additional sample shell.

Firth's new type capped high explosive shell.

The firm has recently supplied to the Italian Ministry of Marine a number of experimental 254-mm. capped high-explosive shell, from which highly successful results were obtained. To obtain the large capacities specified, it was, of course, impossible to avoid the shell being of much weaker design than the ordinary armour-piercing projectile, and the conditions were that at a striking velocity of about 400 mètre-seconds (say 1312 f.s.) these shell should penetrate a plate of chrome-nickel steel a quarter to one-fifth calibre in thickness, and a number of

Firth's 254-mm. capped high explosive shell, after penetrating 9·2-in. K.C. plate.



Firth's 254-mm. capped high explosive shell, after penetrating 9·2-in. K.C. plate.

Firth's 254-mm. capped high explosive shell fired into sandbank and recovered.

the projectiles submitted performed this task in a satisfactory manner, as the photos here reproduced and the following particulars show :—

Shell No.	Capacity in litres.	Weight of burster in kilos.	Filled and fused weight in kilos.	Striking velocity M.S.
M. 857	12	17·90	217·00	406·9
M. 847	12	17·90	do.	400 (about)
M. 843	13	19·42	do.	399·8
M. 851	13	19·42	do.	403·5
M. 858	14·5	21·7	do.	406

Results.—No. M. 857.—"Very good circular hole, coppered all round. Shell recovered entire." No. M. 847.—"Shell penetrated plate, passed out at top of butt, and was recovered intact." No. M. 843.—"Good circular hole, coppered all round. Shell whole, but shows several cracks on body." No. M. 851.—"Shell recovered entire. No cracks." No. M. 858.—"Hole circular and well coppered. Shell recovered whole, but with crack half way down body. As this shell was fired without cap, and is of high capacity, this result is particularly satisfactory."

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During the past year or two the requirements of the Home Government in projectiles have been very small, but the firm have secured a large contract from the Italian Government for capped armour-piercing projectiles of 203, 254, 305, and 343 mm. calibre. This order was secured after very severe competition, and at the trials which preceded the placing of the contract Messrs. Firth's projectiles alone were successful in fulfilling all requirements. Sufficient has been said to indicate the progressive spirit which has always been shown by this company, and to show that their facilities for the manufacture of all classes of projectiles are not only thoroughly up to date and of the most modern type, but have been developed by the best of all possible processes during a long and successful experience. Another speciality of the firm, and one in which they have achieved marked success, is the supply of nickel-steel air-vessels and ends for torpedoes. Large orders for this class of material have been executed for the Home and foreign Governments.

Hadfield's improvements in projectiles.

Another British firm of makers of projectiles, the Hadfield Company of Sheffield, have obtained excellent results with cast-steel shells, and their "Heclon" and "Eron" specialities have scored marked successes at trial. Reference was made to the subject by Captain Tressider in 1905, and the British Navy being so largely equipped with these projectiles, it may be of interest to show what one of the Hadfield "Heclon" type will do. The illustration on page 313 represents the results obtained from a proof shell (capped) of 12-in. calibre. It will be seen that not only did the "Heclon" projectile perforate unbroken a 12-in. K.C. plate and backing, but it succeeded in getting through about twenty-four feet of sand. This shows the considerable amount of remaining energy of the projectile after perforating the plate. In Spain, Messrs. Hadfield have been successful, and have completed large calibre capped shell for the Spanish Navy. One of the "Heclon" projectiles has recently been fired at a foreign proving ground with remarkable results. The plate attacked was twelve inches in thickness, of the K.C. type, backed with twelve inches of oak backing and three half-inch skin plates. Such a plate is usually attacked by a one-calibre projectile, *i.e.*, 12-in., but in this case a "Heclon" projectile of 10-in. calibre was fired, with a velocity of 1877 f.s. The shell perforated the plate and backing, and was found with only the point and two pieces of the shoulder broken off at a distance of 2600 feet beyond the target. The "Heclon" 7·5-in. capped projectiles have also perforated 9-in. K.C. plates at 1975 f.s. velocity, the shell passing through this test and being found undamaged far beyond. Messrs. Hadfield have also supplied their 6-in., 7·5-in., 9·2-in., 10-in., and 12-in. capped "Heclon" A.P. projectiles to the

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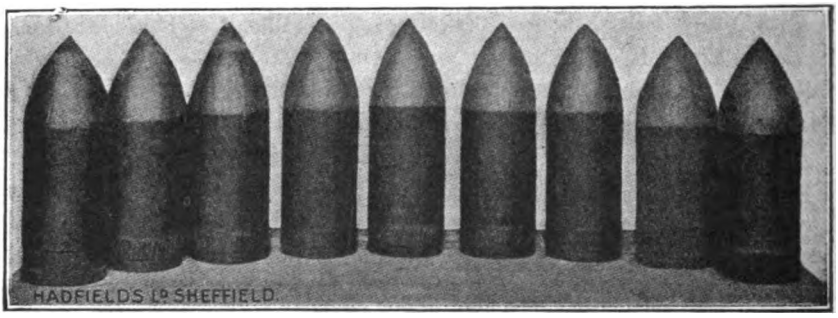
British Government. We illustrate a number of these 12-in. "Heclon" projectiles, after having perforated 12-in. K.C. plates, with a striking velocity of 1950 f.s. Each of these shells represents a lot of 400 supplied to the British Government. The "Eron" projectile is of armour-piercing type, has a bursting capacity as great as the ordinary common shell, and is capable of perforating at long distances three-quarters of its calibre of the latest type of K.C. armour. Not only is it exceedingly accurate at long ranges, but there is a great gain in range efficiency. As an illustration of the advantages of the "Eron" shell it may be mentioned that at a range of about 3000 yards, with the same muzzle velocity as the ordinary type of shell, the "Eron" will have a flight of about 3200 yards, or about 200 yards gain over the ordinary type hitherto used; at 8000 yards there is about 1000 yards gain, and at 10,000 yards the "Eron" shell has a range of 11,400 yards, or a gain of 1400 yards. The above shows a very considerable increase of ballistic



"HECLON" ARMOUR-PIERCING SHELL.

coefficient. It is also claimed for it that, owing to its construction, it is the safest explosive shell yet introduced. For the manufacturers of projectiles there has been a quiet time during the last two years, but to show the reserves at the disposal of this country it may be mentioned that Hadfield's capacity in the manufacture of projectiles is about 7000 to 10,000 rounds per week of shell of 3-inch and under 6-inch calibres; about 2000 6-inch weekly, and over this calibre about 600 to 800 weekly. This is largely due to the manner in which the firm have specialised their plant, and for projectiles of the types known as common and armour-piercing they claim to have the largest manufacturing capacity in the world.

Recent trials of "Era" steel shields.

Reference has already been made to the "Era" steel manufactured by the company, and the following results of recent trials should be interesting:—

"One of the tests was the attack of a 6-in. mild-steel shield of

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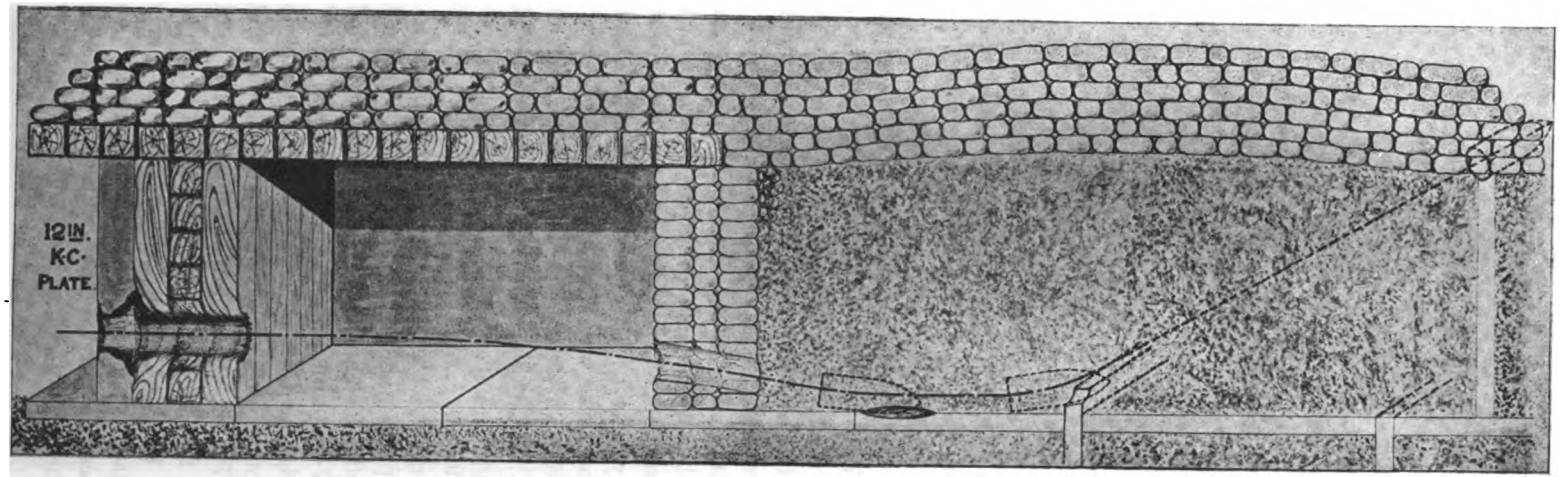
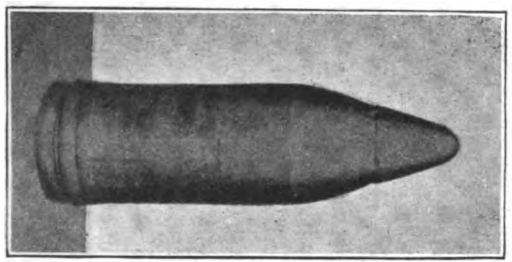
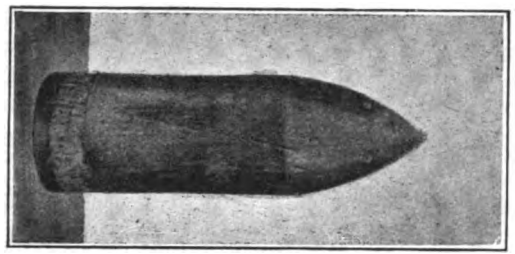


Hadfield's 12-in. " Heclon " capped A.P. shell, fired at Shoeburyness, Jan. 3, 1908, with a velocity of 1986 f.s., perforating a 12-in. K.C. plate, 3 ft. of oak backing, and after indenting two heavy steel plates in the butt, recovered undamaged.



Shell before firing.



Same shell after firing.

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forged steel in order to compare it with one of the Hadfield 'Era' steel shields of exactly the same thickness and design. The following were the results obtained:—At the 'Era' steel shield there were fired normally and obliquely five rounds of 4·7-in. armour-piercing shell, with an average striking velocity of 1950 f.s.; one round each of 6-in. armour-piercing, common, and lyddite shell, with an average velocity of 2035 f.s.; and seven rounds of 10½-cm. capped armour-piercing shell, with an average velocity of 1850 f.s.. The whole of the rounds gave a total energy expended upon the shield of 19,300 foot-tons. At the ordinary steel shield there were fired four rounds of 4·7-in. armour-piercing shell, one of which completely perforated it; one 6-in. common shell, filled and fused, which completely wrecked the shield. A similar shield of K.C. material cracked badly on the impact of the common shell, and was put out of service. This trial shows, then, that in the case of the mild steel shield six inches thick it was incapable of resisting the energy of modern projectiles, being broken and put out of action at the fifth round, also the K.C., whereas the 'Era' steel shield, notwithstanding that fifteen rounds, from 4·7-in. to 6-in. shell, including common, lyddite, and armour-piercing shell, were fired at it, representing a striking energy of 19,300 foot-tons, was still serviceable at the end of the attack. There was not a single crack or fracture on the shield after these rounds had been fired. This shield had been further attacked by a number of 10½-cm. uncapped and capped armour-piercing shell fired at the thinnest portions of the shield both normally and obliquely, but it still remains uncracked and quite serviceable. A further test was that of a plate of 'Era' steel, six inches in thickness by only six feet square, which was erected at an angle of 50° to the normal, and was attacked by no less than five uncapped and capped armour-piercing projectiles, 6-in., 7·5-in., and 9·2-in. All of these it successfully withstood without cracking or breaking or being perforated. The total energy of uncapped and capped projectiles obtained on the small plate was 37,600 foot-tons. Tests were also carried out at Shoeburyness on a 7-in. ammunition tube made of 'Era' steel, eight feet in length, weighing 16 tons. This tube has stood no less than 17 rounds of armour-piercing shot and shell, capped and uncapped, including 6-in., 7·5-in., and 9·2-in. calibre. The total energy expended was 49,420 foot-tons. The tube is still in excellent condition, whereas a tube of the best forged ordinary steel similarly tested was broken into many fragments after five rounds. An important test has been recently carried out by the British War Office at Shoeburyness for the Indian Government on a 7·5-in. 'Era'

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steel shield weighing 27 tons. The shield was attacked in the following manner:—One round of 6-in. armour-piercing shot at a velocity of 1550 f.s. caused only a slight indentation. Three rounds of capped 7·5-in. armour-piercing shot at velocities averaging from 1860 f.s. to 1920 f.s. None of these projectiles perforated the shield. Notwithstanding the severity of this test, this shield is still serviceable. Under the same conditions a similar shield in forged mild steel would have been rendered unserviceable by this attack or completely destroyed."

It has, indeed, been said that the highly efficient armour-piercing projectiles at the present time produced and furnished with caps have largely robbed the type of armour known as "K.C." of its protective qualities; and it is likely, therefore, that before long there will be a reaction in favour of armour having exceedingly tough qualities rather than mere surface hardness. K.C. plates of six inches in thickness have been perforated at as low a velocity as 1600 f.s. by Hadfield capped projectiles, so that the f.m. (figure of merit) of this armour is much less than is ordinarily believed. In this case the f.m. of the K.C. plate was only 1·80, and it is still less under "super-calibre" attack, that is, with shell having larger calibre than the thickness of armour attacked. The tough "Era" armour under super-calibre attack has about the same f.m. as K.C. attacked by capped projectiles. This is obtained without the dangers of K.C., "Era" steel not being liable to crack or break up. In proof of this, the following experiments were carried out at the Hadfield proof butt:—

ATTACK OF DIFFERENT TYPES OF ARMOUR, EACH 2-IN. IN THICKNESS, BY CAPPED ARMOUR-PIERCING SHELL OF 10½ C/M (4⅛-IN.) CALIBRE, WEIGHING 32 LBS., INCLUDING CAP.

Round No.	Plate.	Velocity.	F.P.	Result.
		f.s.		
1	Rolled armour plate steel, neither cemented nor quenched.	1,074	1·85	Shot practically through, penetration 10 ins., only driving band prevented base portion passing through.
2	K.N.C. type of armour.	1,100	1·94	Shot unbroken, *through* plate and backing.
3	K.C. type of armour, cemented and face quenched.	1,040	1·78	Shot broken, *through* plate and backing.
4	Hadfield's Cast "Era" Steel.	1,070	1·84	Plate not perforated; penetration 5 ins., much less than in any of the other rounds.

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Sir George Clarke on "Era" armour.

It may be interesting also to quote Sir George Clarke's remarks on this subject from the new edition of his work on "Fortification." He says (page 202):—

"There is no finality in the designs of mountings for coast artillery, and those above described will in due time be superseded by better arrangements. The shields are far from satisfactory; but the curved forms required could not at the time be obtained in hard-faced armour, or would have been inordinately expensive. Already, however, Mr. R. A. Hadfield has succeeded in producing an excellent cast steel, which has given surprising results in firing trials, and lends itself exactly to the requirements of coast artillery. . . . The protection of the 9·2-in. mounting might be improved by the use of this cast steel. If power, such as electricity, from an external source can be applied, simplification of design, combined with a great reduction of labour and a higher speed of fire, becomes possible. Future progress may lie in this direction."

A reproduction of a 6-in. gun mounting, which Sir George Clarke also refers to as illustrating the adaptability of form which is now available, will be found on page 275.

Necessity for systematizing Government orders.

It may be said, in conclusion, that our enquiries clearly indicate that the present resources of manufacture of this country should be fully adequate for any calls that may be made upon them, but, if the authorities act wisely, they will encourage private enterprise by systematizing their demands. A firm producing war material must naturally look to the Admiralty and War Office for the bulk of its orders, filling in with such other work as can be obtained from the Colonies and abroad. Most of the important foreign Governments, however, from motives of policy and national safety, insist on all war materials being manufactured within their own borders. A large portion of the plant employed in the manufacture of armament is specially designed for the purpose, and unsuitable for other work; consequently a dearth of Government orders generally involves its complete or partial stoppage. An enormous outlay in capital is thus rendered unproductive, and large numbers of skilled workmen are thrown out of employment, with the result that great distress prevails at times in the various towns connected with these industries. It is possible that this evil might be minimised if the execution of Government orders were to be spread out over a longer period, thus increasing the duration of employment and obviating the necessity for working overtime. Manufacturers cannot be expected to grapple with these difficulties continuously, and should a long period of depression occur there will naturally be a tendency for them to gradually direct their energies more and more into other

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channels in which there is a greater chance of keeping their plant more fully employed.

Viewed from a national standpoint, it is hardly necessary to point out how essential it is that the national arsenals and dockyards should be reinforced and supplemented by the energy and enterprise of private manufacturers, many of whom, having their works situated away from the coast, should be more secure from interference by an enemy in time of war.

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BRITISH RIFLED ORDNANCE.

Ordnance.										Charge (cordite).		Projectile.						Ballistics (with full charges).					
Nature.			Total length in inches.	Length of Bore, including Chamber.	Chamber.		Rifling.		System.†									Total muzzle energy.	Perforation of wrought iron.				Perforation Krupp steel, 3000 yards. Uncapped Shot.
							Twist one turn in.												At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards.	
Calibre or Pr.	Weight.	Mark and Service.*			Diameter (at largest).	Length to base of projectile.	Least at breech.	Greatest at muzzle.		Weight.	Size.	Diameter.	Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^3}{w}$.	Value of $\frac{w}{d^2}$.	Muzzle velocity.						
B.L. GUNS.				cals.	ins.	ins.	cals.	cals.		lbs. oz.		ins.	lbs.	lbs. oz.			f. s.	ft. tons.	ins.	ins.	ins.	ins.	ins.
16·25-in.	110½ tons.	III.	524·0	30·0	21·125	84·5	newer patterns.	30	Modified Pl. Section, the last in the new guns.	960† S.B.C.	..	16·25	1800	‡‡193 **179¼	0·147	0·420	2087	54,390	38·0	34·6	31·7	29·4	13
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5		30		187 8	..	13·5	1250	**85	0·146	0·508	2016	35,230	33·0	30·2	27·6	25·2	11
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		167 8	50	12·0	850	80–1 9/11 ¶	0·169	0·492	2367	33,020	37·0	32·7	29·4	26·6	11½
12-in.	50 tons.	IX. Wire	496·5	40·0	17·5	87·2		..		201 8	50	12·0	850	,,	..	..	2481	36,290	39·7	35·4	31·6	28·7	12½
										9 8	33¾						§2580	39,280	42·0	38·0	34·6	32·0	14
12-in.	58 tons.	X. Wire	558·0	45·0	..	..		..		325 0 M.D.	..	12·0	850	..	..	..	2900	47,697	51·0	46·2	42·0	38·4	17
10-in.	31 tons.	Triumph & Swiftsure	483·0	45·0	14·0	64·5		..		..	..	10·0	500	..	..	..	§2800	§27,205	39·5	34·6	30·2	27·0	11¾
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0		30		76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	24·8	21·8	19·3	17·0	7½
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		42 0	30	9·2	380	18 ‡‡33 **30 6/16	0·223	0·488	1781	8,356	18·3	15·9	14·4	12·4	5½
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0		30		53 8	30	9·2	380		0·223	0·488	2065	10,910	22·9	19·8	17·2	15·5	6¾
9·2-in.	25 tons.	Wire VIII.	384·0	40·08	10·5	53·15		..		63 0	40	9·2	380	..	0·223	0·488	2347	14,520	27·6	23·9	20·7	18·0	7¾

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9·2-in ††	28 tons.	Wire X.	442·35	46·6	13·0	71·215	Various in the	..	P. Elswick, Hook, or	103	0	44	9·2	380	..	0·223	0·488	{2640 ◊2800	18,400 20,685	33·3 36·0	28·9 31·2	25·0 27·4	22·0 24·0	9½ 10½
7·5-in.	16 tons.	{Triumph & Swiftsure}	386·7	50·0	..	46		..		..	..	..	..	200	..	0·281	0·474	§2800	10,883	29·0	24·9	21·4	17·8	7¾
7·5-in.	14 tons.	..	337·5	45	11·1	55		30		{47 0 30 2 8 2½}			7·5	200	18½	0·281	0·474	2600	9,340	26·0	22·3	18·8	15·7	6¾
6-in.	5 tons.	III.	170·7	25·53	8·0	26·75		35					6·0											
6 in.	5 tons.	{IV. VI.}	173·5	26·0	8·0	26·75		35 30		14	12	20	6 0	100	{7·4 Tonnant **9 18/16}	0·360	0·463	1960	2,665	13·4	10·7	8·9	7·0	3
6-in.	7·4 tons.	{VII. VIII.}	269·5	45	8·5	32·7		30		20	0	20	6·0	100	9	0·360	0·463	{2493 ◊2750	4,308 5,250	19·6 22·3	15·3 18·0	11·9 14·6	9·8 11·6	4½ 5
4-in.	{23 cwt. 26 cwt.}	II.II.A III.III.A IV.V.& VI.	120·0	27·0	5·3	18·5	120	30		3	1	5	4·0	25	{1 12/16 3 8/16}	0·640	0·391	1900	625	7·7	5·4	4·0	3·0	..

* The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c. Some details of the 12-in. Mark X. uncertain.
† P. means Polygroove; Pl., Plain; ‡ Cordite has not been introduced for this gun; ◊ Estimated with M.D. cordite; ** Cast steel; †† A 50-calibre 9·2-in. gun is under construction; ‡‡ Forged steel.

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BRITISH RIFLED ORDNANCE—*continued.*

Ordnance.											Charge (full).	Charge (cordite).		Projectile.						Ballistics (with full charges).					
Nature.					Chamber.		Rifling.															Perforation of wrought iron.			
Calibre or Pr.	Weight.	Mark and Service.	Total length in inches.	Length of Bore, including Chamber.	Diameter.	Length to base of projectile.	Twist one turn in: Least at breech.	Twist one turn in: Greatest at muzzle.	System.*		Weight.	Weight.	Size.	Diameter.	Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^3}{w}$.	Value of $\frac{v^2}{d^3}$.	Muzzle velocity.	Total muzzle energy.	Muzzle energy per ton of gun.	At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards range.
QUICK-FIRING GUNS (using metal cases)				cals.	ins.	ins.	cals.	cals.			lbs.	lbs.	ozs.	ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.	ins.
6·0 in.	7 tons	I. & III. IL. (Wire)	249·25	40	..	..	60	30	P.		..	13	4	30	6·0	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2	8·2
6·0 in. Q.F.C.	5 „	I. to VI.	169·1	26·2	..	..	..	..												1913	2537	362	13·0	10·3	8·2	6·4
			166·6	26·6	..	..	..	..																		
4·7 in.	41 cwt. / 42 „	I. II. III. & IV. Wire	194·1	40	..	..	100 / 0	34·4 / 30	E.O.C.		..	5	7	20	4·72	45·0	..	0·495	0·428	2188	1494	711	12·4	9·2	6·6	5·0
4 in.	26 cwt.	I. II. III. Wire converted guns	165·25 / 120	40 / 28	..	..	..	30	M.Pl.		..	3	9	15	..	25·0	..	0·640	0·390	2300	917	705	10·5	6·9	4·9	3·3
																				2177	821	569	9·5	6·5	4·6	3·0
12-pr.	12 cwt.	I.	123·6	40	..	..	120 / 0	28 / 30	E.O.C. / M.Pl.		..	1	15	10	3·0	12·5	..	0·072	0·463	2210	423	677	8·1	5·3	3·5	2·4
12-pr.	8 cwt.	I.	87·6	28	..	..	60 / 0	28 / 30	E.O.C. / M.Pl.		..		13¾	10	3·0	12·5	..	0·072	0·463	1607	223·8	544	4·9	3·2	2·4	..
Hotchkiss . 6-pr...	8 cwt	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.		..		b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..																				
Hotchkiss . 3-pr ..	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.		..		b6⅜	5	1·85	3·3	..	1·087	0·521	1873	80·3	321·2	4·1	2·1	..	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4											..	..	..	..	..	1920	84·3	337·2	4·3	2·2	..	..
MACHINE GUNS.																										
Maxim, 1 bar 0·45 in.	63 lbs.	I.	45·0	..	..	..	10	27	Enf'ld		grains. 31 Cordite	..		..	grs. 0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle.			
Maxim, ·303			42·38				10	25·6	Metf'd						0·303	215	..	..	..	..	..	..	Same as Lee-Metford.			

* P. means Polygroove; M.Pl., Modified plain.

b With 4 grs. B.P.C.

Note.—An armour-piercing shell has [illegible]

AUSTRIAN NAVAL ORDNANCE.

Designation by Calibre, in centimètres, length in calibres, and type of gun	30 5 L. 35 K. 80	24 L. 40 K. 01	24 L. 40 K. 94	24 L. 35 K. 86	19 L. 42 Skoda.	15 L. 40 Skoda.	15 L. 35 K. 86	15 L. 35 K. 80	12 L. 40 Skoda.	12 L. 35 K. 80	12 L. 35 K. 87
Calibre, in inches	12·01	9·45	9·45	9·45	7·5	5·91	5·87	5·87	4·72	4·72	4·72
Length — Total, in feet	35·11	31·6	31·4	27·60	26·3	19·5	17·13	17·13	15·74	13·8	13·8
Length — Rifled Portion, in ins.	314·8	291·3	286·2	237·7	239·7	182·6	151·4	153·6	147·6	128·5	126·3
Length — Powder Chamber in ins.	69·9	59·0	63·7	65·2	51·8	35·4	37·3	35·4	28·3	24·0	26·3
Length — Of bore in calibres	35	40	40	35	42	40	35	35	40	35	35
No. of Grooves	68	72	72	25	56	44	36	36	36	32	36
Twist in calibres	45–25	..	..	26·9	..	..	45–25	25	25	25	25
Weight — Gun, tons	47·2	21·5	27·8	26·6	11·6	5·18	5·7	4·69	1·97	2·25	2·31
Weight — Breech Block, in lbs.	3306·9	..	..	1776·9	..	..	445·3	463·0	..	253·5	211·6
Weight — Steel Shell „	1003·1	474	474	474·0	198	112·5	112·5	86·0	52·4	57·3	57·3
Weight — Common Shell „	1003·1	474	474	474·0	..	112·5	112·5	69·9	52·4	57·3	57·3
Weight — Shrapnel Shell „	..	..	..	..	..	..	112·4	71·9	..	57·3	57·3
Weight of Bursting Charge — Case Shot „	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge — Steel Shell „	10·6	..	..	5·1	..	..	1·3	1·76	..	0·55	0·55
Weight of Bursting Charge — Common Shell „	97·7	..	..	17·9	..	..	5·29	3·86	..	2·2	2·2
Weight of Bursting Charge — Shrapnel Shell „	..	..	..	..	..	..	1·26	1·10	..	0·57	0·57
Weight of Firing Charge — Steel Projectile, in lbs.	156·5 24 cm.N	120·6	91·5	99·2N	56 N	28·8	22·5 15 cm.N	38·8*	9·7	19·8 B	12·13N
Weight of Firing Charge — Common Shell, in lbs.	156·5 N 24 cm.N	120·6	91·5	99·2N	56 N	28·8	22·5 15 cm.N	38·8*		19·8 B	12·13N
Weight of Firing Charge — Shrapnel, in lbs.	..	..	..	..	..	..	..	..	..	..	..
Weight of Firing Charge — Exercising, in lbs.	154·3B	..	..	..	..	..	28·7	19·6	..	11·0	6·6 N
Weight of Firing Charge — Saluting „	19·8 O	..	..	15·4 O	..	..	4·74	4·74 O	..	2·4 O	2·4 O
Muzzle Velocity, in feet	1969	2595	2264	2100	2700	2608	2133	1969	2264	1755	2133
Muzzle Energy — Total, foot-tons	26,970	22,121	16,845	14,500	10,025	5308	3549	2312	3554	1215	1808
Muzzle Energy — Per inch circumference, foot-tons	714·8	..	..	488·3	..	..	192·5	125·4	..	82·5	122·2
Thickness of Iron, perforated inches at Muzzle, by Tresidder's formula	30·1	34·5	29·0	25·8	27·3	22·0	16·1	12·6	13·7	9·7	12·9
Perforation of Krupp Steel, 3000 yds., inches	10	9½	8	7	6¾	5	3½	..	..	..	..

NOTE.—C for cube powder; * prismatic powder: O, ordinary powder; B, brown prismatic. N, nitro-glycerine smokeless powder.
There are other types of Krupp guns, also Skoda 7-cm., Skoda and Hotchkiss 47-mm., and Hotchkiss 37-mm.

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DANISH NAVAL ORDNANCE.

	Krupp B.L. Guns designated.													
Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	24 cm.	24 cm.	21 cm.	15 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm.	8·7 cm.
Calibre, in inches	13·98	12·01	10·24	10·24	9·4	9·4	8·24	5·9	5·91	5·91	5·91	4·72	4·72	3·43
Total length, in feet	29·1	22·0	32·8	18·77	31·4	31·6	24·04	..	17·1	12·63	10·7	11·8	..	11·5
Length of Bore, including Powder Chamber — in inches	304·7	227·2	327·6	194·5	..	..	264·5	..	190·3	135·0	112·9	128·8	..	..
Length of Bore, including Powder Chamber — in calibres	21·8	18·9	32·0	19·0	37	37·5	35	40	32·2	22·8	19·1	27·3	37·5	37·1
Number of Grooves	80	68	60	60	..	..	48	..	36	36	36	32	..	..
Twist of Rifling, in calibres	45	45	70–25	45	..	..	70–25	..	70–25	45	45	25	..	..
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	25·4	22·9	13·3	..	4·7	4·4	3·5	2·13	..	..
Weight of — Breech Block, lbs.	4695·8	2910	2006	1940	..	..	903·9	..	390·2	330·7	324·1	229·2	..	..
Weight of — Steel Shell, „	1157·4	725·3	451·9	451·9	353	353	238·1	112	112·4	..	86·0	..	44	..
Weight of — Chilled Shell, „	1157·4	725·3	..	451·9	..	..	..	..	..	86·0	86·0	..	..	..
Weight of — Common Shell, „	1157·4	725·3	451·9	451·9	230	353	238·1	112	112·4	69·4	69·4	57·3	44	20
Weight of — Shrapnel Shell, „	1157·4	725·3	451·9	451·9	..	..	238·1	..	112·4	86·0	86·0	57·3	..	..
Weight of — Case Shot, „	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge — Common Shell, „	57·3	39·7	25·4	25·4	16·5	16·5	12·8	6·2	6·2	3·0	3·0	1·7	..	..
Weight of Firing Charge — Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	..	75*	105·8	20·9*	41·9	19·3	21·8	17·4	9·7*	3·59*
Weight of Firing Charge — Common Shell, „	330·7	180·2	191·8	112·4	..	75*	105·8	..	41·9	19·3	21·8	17·4	..	..
Muzzle Velocity — Armour-piercing Projectile, feet	1762	1675	2018	1640	2159	2362	2021	2264	1800	1565	1542	..	2460	2379
Muzzle Velocity — Common Shell, „	1762	1675	2018	1640	..	..	2021	..	1890	1683	1690	1720	..	..
Muzzle Energy — Total foot-tons	24910	14110	12770	8428	11,440	13,656	6745	3981	2784	1461	1418	..	1846	780
Muzzle Energy — Per inch circumference, foot-tons	568·3	374·1	396·8	262·0	..	..	260·6	..	150·0	78·7	73·0	..	..	..
Perforation at Muzzle, wrought iron, Tresidder's formula	25·6	20·1	22·9	16·8	23·3	26·7	18·5	17·8	15·6	12·6	..	..	14·2	10·7
Perforation Krupp Steel, 3000 yards, inches	7	5½	6	4⅝	6	7	5	3½	3	..	..	..	..	..

* Smokeless powder.

There are also a Finspong 6-in. and a 44-calibre 5-pr. Hotchkiss, V. = 2362 f.s.

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DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading Q.F.											Dutch Breech Loading.
Designation by Calibre, in centimètres	28	24	21	21	21	No. 2.	15	15	12	12	12	12
Calibre, in inches	11·0	9·4	7·91	8·2	8·2	5·87	5·9	5·9	4·72	4·72	4·72	4·72
Total Length, in feet	27·5	31·6	24·04	24·0	27·5	17·13	17·1	19·7	13·9	15·9	13·78	13·78
Length of Rifled Portion of Bore, in inches	..	..	222·2	..	..	151·4	..	..	..	..	128·5	..
Length of Powder Chamber „	..	..	42·4	..	..	37·7	..	..	..	..	24·0	..
Length of Bore, in Calibres	27	37	35	32	37·1	35	32	37	32·3	37·3	35	35
Number of Grooves	..	..	$\frac{48}{64}$	..	..	44	..	..	..	..	32	32
Depth of Grooves, inches	..	..	0·059	..		..	..	..	..	..	..	0·06
Twist of Rifling, in Calibres	..	..	∝–25	..	..	25	..	..	..	..	25	∝–45
Total Weight, in tons	27	25·3	$\frac{12·79}{13·98}$	14·0	16·2	4·72	3·8	4·7	1·9	2·7	2·26	2·31
Firing Charge — Armour-piercing Projectile, in lbs.	185	..	99·2	119	..	49·6	15·4	18·5	..	..	19·8	19·5
Firing Charge — Common Shell „	..	..	99·2	..	..	49·6	..	..	..	..	19·8	19·8
Weight — Armour-piercing Projectile „	761	474	308·6	309	309	112·2	100	88·2	52·4	57·4	57·3	57·3
Weight — Common Shell „	..	..	308·6	..	..	112·2	..	..	..	..	57·3	57·3
Weight — Case Shot „	..	..	..	..	..	..	..	..	..	..	57·3	..
Bursting Charge — Armour-piercing Projectile „	..	..	4·6	..	.	..	..	..	..	..	..	..
Bursting Charge — Common Shell „	20	..	12·3	..	..	..	..	..	..	..	..	..
Muzzle Velocity, feet	1627	2562	1739	1903	2067	2001	2034	2461	2034	2067	1755	1804
Muzzle Energy — Total, in foot-tons	18,960	21,589	6471	7760	9756	3115	2867	3703	1503	1689	1224	1264
Muzzle Energy — Per inch Circumference, foot-tons	..	..	260·7	..	..	169·0	..	..	..	.	82·5	85·2
Perforation at Muzzle, in inches	20·0	34·0	16·8 / 17·1	19·4	21·9	13·6 / 14·8	14·3	17·9	11·6	12·4	9·4 / 10·1	9·6
Perforation Krupp Steel, 3000 yards	5½	9½	3½	4½	5	..	..	..	..	..	..	..

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FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun	Model 1902.	Model 1893–96.				Model 1893.					Model 1887.				1884.					1881.						
Desig. by Calibre, in cms.	30·5	30·5	27·44	24·0	19·4	34·0	30·5	27·44	24·0	19·4	34	30·5	27	19	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14
Calibre, in inches	12·01	12·01	10·8	9·45	7·64	13·39	12·0	10·8	9·45	7·64	13·39	12·0	10·80	7·64	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46
Total length, in feet	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	380·6	280·2	306·9	269·3	180·9	180·9	162·6
Length of Bore, in cals.	45	45	45	40	40	35	40	45	40	40	42	45	45	45	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035
Rifling Twist	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°
Total weight, in tons	..	44·4	34·5	23·6	12·5	52·9	45·9	34·9	22·4	10·6	60·0	49·2	37·1	10·6	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2
Weight of Firing Charge — Armour-piercing Projectile, lbs.	..	246	188·5	145½	74	243·0	198·4	114·6	110·2	44·1	220·5	198·4	114·6	44·1	388·0	200·6	..	42 5	..	388·0	337·3	203·9	149·9	42·5	32·6	..
Weight of Firing Charge — Com. Shell lbs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1
Weight — Armour-piercing Projectile* lbs.	750	750	562	375	190	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..
Weight — Com. Shell „	..	644	476	317	165	..	..	..	..	..	..	..	..	..	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1
Weight — Case Shot „	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130·7	130·7	61·7
Muzzle Velocity, in f.-s., A.P. Projectile	2870	2650	2650	2870	2870	2400	2625	2625	2625	2625	2560	2625	2625	2625	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936
Muzzle Energy — Total, in f.-t.	42890	36782	27186	21445	10890	36850	30750	22750	15170	7898	42040	30750	22750	7898	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..
Muzzle Energy — Per in. circ., f.-t.	..	..	..	..	..	..	815·8	670·7	511·1	329·1	..	815·8	670·7	329·1	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·2	..
Perforation at Muzzle† wrought iron, inches	46·0	42·7	38·8	37·0	29·0	36·8	37·3	33·7	29·4	23·4	40·8	37·3	33·7	23·4	27·6	22·0	19·2	13·0	10·7	27·6	24·2	22·0	19·2	13·0	11·6	..
Perforation Krupp Steel 8,000 yds.	15½	13½	11½	10½	6¾	11½	11	9	7½	5½	13	11	9	5½	7½	6	5¼	3	..	7½	7	6	5¼	3	..	..

* Steel or chilled iron.
A new type of the 1902 Model is under trial of [illegible] 7·6 in. and 3·9 in. calibre.

† By Tresidder's formula.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	16·47.	Q.F. Guns.							
		16·47	16§	16‡	14§	14	Mod. 92. 10	Mod. 91. 10	Mod. 81. 10‡
Desig. by Calibre, in cms.	16·47		16·47		13·86			10·00	
Calibre, in inches	6·46		6·46		5·44			3·94	
Total length, in feet	26·9								
Length of Bore, in inches	..								
Length of Bore, in calibres	47·5	45	45	30	45	30	60	50	26
Number of Grooves	..								
Depth of Grooves, inches	..								
Rifling Twist	..								
Total weight, in tons	8·5*	8·1	6·89	4·92	4·13	3·84	2·19	1·62	1·18
Weight of Firing Charge — Armour-piercing Projectile * lbs.	..	44	30·2	19·0	16·1	12·8	8·16	8·16	5·07
Weight of Firing Charge — Common Shell „	..								
Weight — Armour-piercing Projectile lbs.	115	115	99·21		66·14			30·87	
Weight — Common Shell „	..								
Weight — Case Shot „	..								
Muzzle Velocity, in ft.-secs.	3000*	2870	§2625	2100	2625	2100	2500	2428	1840
Muzzle Energy — Total, in foot-tons	7185	6568	4730	3061	3160	2022	1340	1266	725
Muzzle Energy — Per in. circ. foot-tons	..	..	233·5	150·9	184·9	118·7	..	..	..
Perforation at Muzzle, wrought iron, inches	26·3	24·5†	20·0†	14·4†	17·7†	12·7†	13·0†	12·5†	8·2†
Perforation Krupp steel, 3,000 yards	5¾	5¼	4	..	..	..	..	..	..

* Estimated. † By Tresidder's formula. ‡ Models 1881 and 1884 converted guns.
§ There are three models of the years 1887, 1891 and 1893, of slightly different weights from the above.

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GERMAN NAVAL ORDNANCE.

	Krupp Steel Breech-loading Guns, designated by calibre.																	
Designation in centimètres	30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 Q.F.	24 long.	24 long.	21 Q.F.	17	15 Q.F.	15 Q.F.	10·5 Q.F.	10·5 Q.F.	12·5 hoop'd.	10·5 long.	8·8	6
Calibre, in inches	12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·45	9·45	8·2	6·7	5·9	5·9	4·13	4·13	4·92	3·96	3·42	2·36
Length — Total, in feet	21·98	36·75	32·15	18·77	18·77	17·06	31·50	27·56	23·63	27·4	22·3	17·6	19·7	12·1	13·9	9·60	12·08	11·3	4·1
Length — Rifled portion, in ins.	181·9	407·9	352·8	149·8	150·0	129·3	349·6	302·4	201·6	..	..	..	..	..	..	85·7	113·6	..	44·3
Length — Powder Chamber „	45·3			44·7	44·4	44·7	..	..	53·5	..	..	..	..	..	..	16·7	19·5	..	..
Length — Bore, in calibres	18·9	40	35	18·8	18·8	16·8	37·4	32·0	26·1	37·0	37·7	32·2	37·0	32·2	37·2	20·8	33·6	37·2	..
Number of Grooves	72	..	..	36	48	36	..	..	56	..	..	..	..	..	..	32	32	..	24
Depth of Grooves, in inches	0·079	..	..	0·077	0·079	0·077	..	..	0·059	..	..	..	..	..	..	0·059	0·049	..	..
Twist, in calibres	45	..	..	50	50	50	..	..	25	..	..	..	..	..	..	40	25	..	..
Weight — Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	25·4	21·7	18·7	14·0	7·8	4·4	5·4	1·25	2·28	1·38	1·15	..	0·10
Weight — Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	..	..	..	..	..	..	..	..	163·1	149·9	..	..
Weight — Armour-piercing projectile, in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	474·0	474·0	309	..	88	88	40	40	..	..	2·18	..
Weight — Common Shell, in lbs.	725·3	595·0	474·0	357·1	357·1	357·1	474·0	474·0	474·0	309	154	..	..	..	..	40·1	39·7	..	6·61
Weight of Bursting Charge — Armour-piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	7·05	7·05	6·6	4·4	154	..	..	..	..	..	..	..	..
Weight of Bursting Charge — Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	16·5	16·5	15·4	11·1	..	..	..	..	..	2·4	0·9	..	..
Weight of Firing Charge — Armour-piercing Shell, in lbs.	202·8	198·0*	297·6	105·8	105·8	125·7	89·3	152	152·1	60·2	..	13·5	18·7	4·8	..	..	..	..	..
Initial Velocity — Armour-piercing projectile, ft.-secs.	1713	2700*	2133	1588	1588	1578	2296	1803	1657	2360	44	2034	2560	2034	2349	..	..	2400*	..
Initial Velocity — Common shell, ft.-secs.	1713	..	..	1641	1641	1654	..	..	1657	..	2700	..	..	..	..	1545	1526	..	1545
Muzzle Energy — Total, foot-tons	14,750	30,000*	17,740	7211	7211	7119	17,330	10,683	9024	11,934	..	2525	4003	1119	1530	..	..	720	..
Muzzle Energy — Per in. circ., ft.-tons	391	..	512·4	223	223	220	..	401·2	304	..	7795	..	..	..	..	..	..	..	..
Perforation at Muzzle, by Tresidder's formula	20·8	39·0	26·7	15·1	15·1	15·0	29·7	20·7	18·0	26·7	25·5	13·4	19·0	10·8	13·3	..	..	10·0	..
Perforation Krupp Steel, 3000 yards, inches	5⅜	11½	7¼	..	..	..	8½	5⅜	5¼	6½	5⅜	..	4	..	..	..	..	..	..

* Estimated.

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ITALIAN NAVAL ORDNANCE.

		Armstrong Breech Loading.					Q.F.	Armstrong B.L.	Armstrong Quick-Firing.					
Designation by Calibre, in centimètres		43·1†	43·1† Early Pattern. 1882.	34·3	30·5	25·4	20·3	15·2	15·2	15·2	15·2	12·0	12·0	7·6
Calibre, in inches		17	17	13·5	12	10	8	6	6	6	6	4·7	4·7	3·0
Length	Total, in feet	40·75	39	36·09	..	34·8	..	16·9	17·0	20·9	20·9	16·2	13·0	..
	Rifled Bore, in inches	346·8	315·7	..	..	..	..	..	..	..		189	..	..
	Powder Chamber, in inches	84·5	98	..	..	..	..	..	..	..			..	..
	Bore, in Calibres	27	26	..	40	40	45	32	33·0	40	40	40	35	40
No. of Grooves		82	82	56	..	..	..	..	..	..	..	22	22	..
Twist of Rifling, in Calibres		50	50	..	..	..	..	..	..	..	..	34·4	..	..
Total Weight, in tons		104·3	101·5	67·9	..	30	..	5·4	5·1	5·7	6·5	2·05	1·69	0·6
Firing Charge	Armour-piercing projectile, lbs.	900·0	725	630·5	..	..	..	46	46	46	17·6*	..	..	..
	Common Shell, „	600	480	..	..	..	..	..	.	..	..	..	..	..
Weight	Armour-piercing projectile, „	2000	2000	1250	850	448	250	98	98	100	100	45·0	36·0	12
	Common Shell, „	2000	2000	1250	..	..	..	..	..	..	..	..	36·2	..
	Shrapnel „ „	2017	2017	1250	..	..	..	..	..	..	..	..	29·8	..
	Case Shot „	..	..	..	..	..	..	..	..	..	..	..	..	..
Bursting Charge	Armour-piercing projectile, „	32	32	17·4	..	..	..	2·0	2·0	5·1	4·4	..	1·83	..
	Common Shell, „	60	60	87·1	..	..	..	..	..	..	..	..	3·02	..
	Shrapnel „ „	5	5	4·25	..	..	..	..	..	..	..	..	0·35	..
Muzzle Velocity, in ft.-secs.		1992	1935	2016	2500	2460	2600	1952	1985	2149	2297	2180	..	2625
Muzzle Energy	Total, foot-tons	55,030	51,930	35,230	36,925	18,798	11,730	2577	2705	3169	3622	1490	..	573
	Per inch circumference, foot-tons	1035	976·3	830·8	..	..	..	..	..	..	..	..	..	..
Perforation at Muzzle, inches of iron by Tresidder's formula		36·7	35·0	33·0	40·0	31·0	28·3	13·2	13·6	15·4	17·0	12·4	..	10·2
Perforation Krupp Steel, 3000 yds., inches		12½	12	11	13	9	7	..	..	..	3½	..	..	..

* Ballistite. † There are four types of these guns, viz.—Lauria, Lepanto, Italia, Morosini.

Note.—There is also a 6-inch quick-firing gun, 40 cals. M.V., 2600 f.s.

The weight of Ballistite charges is not known, but it is understood that they give the same ballistics as the powder charges shown.

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RUSSIAN NAVAL ORDNANCE.

	Obukhoff Steel Breech Loading Hooped Guns.				Steel B.L. Guns.		
Designation by Calibre, in inches	12	9	8	6 Long.	4·2 9-pdr.	3·43 Long. 4-pdr.	3·43 4-pdr.
Calibre in centimètres	30·48	22·86	20·32	15·24	10·67	8·70	8·70
Total Length, in feet	35	26·25	23·33	17·5	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	..	..	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	..	..	8·0	10·7	..
Length of Bore in Calibres, including Powder Chamber	31·9	35	35	35	17·4	21·4	..
Number of Grooves	..	..	..	..	16	24	12
Depth of Grooves in ins.	..	..	..	..	0·055	0·050	0·050
Twist of Rifling in cals.	..	..	..	..	50	40	41
Total Weight, in tons	55·7	19·44	13·64	6·26	0·87	0·45	0·35
Weight of Steel Shell, in lbs.	731	..	..	..	..	..	..
Weight of Chilled Shell, „	..	..	..	..	..	..	..
Weight of Common Shell, „	..	268·2	192·3	73·35	24·2	15·2	12·6
Weight of Case Shot, „	..	..	..	..	22·3	15·2	11·0
Weight of Firing Charge Steel Shell, „	338	..	..	89·38	..	..	..
Weight of Firing Charge Chilled Shell, „	..	..	..	39·6	..	..	..
Weight of Firing Charge Common Shell, „	..	180	88·2	39·6	2·6	3·1	1·3
Muzzle Velocity, in feet	2090	2376	1925	2080	..	1444	..
Muzzle Energy Total, foot-tons	22130	10,500	..	2682	..	..	..
Muzzle Energy Per Inch Circumference, foot-tons	587·1	371·4	..	142·3	..	..	..
Perforation at Muzzle, in inches	..	20·2	..	12·50	..	..	..
Perforation at Muzzle, by Tresidder's formula	28·3	24·0	15·7	..	..	..	..
Perforation Krupp Steel, 3000 yds., inches	8	6	..	..	..	..	..

There exist also 15 and 10·7 cm. Krupp guns.

NEW PATTERN RUSSIAN NAVAL GUNS.

The following guns are in use in the Russian Navy, the ballistics being somewhat as under :—

	12-in.	10-in.	9-in.	8-in.
Weight	59 tons	32 tons	..	..
Length	40 cals.	45 cals.	45 cals	45 cals
Projectile	720 lbs	488 lbs	403 lb.	188 lbs
Muzzle Velocity	2600 f.s	2600 f.s	2500 f.s	2800 f.s
Perf. Wt. Ir (Muzzle	38 ins.	35 ins.	32 ins.	27 ins.
Perf. Wt. Ir (2000 yds.	30 „	27 „	24 „	20 „
Perf. K.S. 3000 yds.	12 „	10½ „	8½ „	6½ „

Q.F. GUNS.

	6-in.	4·7-in.	12-pdr.
Length	45 cals.	45 cals	50 cals.
Projectile	89 lbs.	46 lbs.	12 lbs.
Muzzle Velocity	2900 f.s.	2600 f.s.	2700 f.s.
Perf. Wt. Ir. (Muzzle	22½ ins.	15½ ins.	10·2 ins.
Perf. Wt. Ir. (2000 yds.	13 „	9 „	4·8 „
Perf. K.S. 3000 yds.	4⅜ „	..	..

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SPANISH NAVAL ORDNANCE.

	Hontoria, Pattern 83. Breech Loading.								Armstrong, Pattern 83.			Armstrong.			Krupp.						
												Muzzle Loading.		Pattrn. 81 B.L.	Breech Loading.	Q.F. guns.					
Designation by Calibre	32-cm.	28-cm.	24-cm.	20-cm.	18-cm	16-cm.	14-cm	12 cm.	12-cm.	8·7-cm.	7·5-cm. long.	22·86-cm	20·3-cm	6-in.	15-cm.	12-cm.	15-cm.	14-cm.	12-cm.	75-mm.	57-mm.	47-mm.
Calibre, in inches . .	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72	4·72	3·4	2·95	9·00	8·00	6·00	5·87	4·72	5·9	5·51	4·72	2·95	2·24	·85
Length: Total length, in feet	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5	13·75	7·9	7·50	13·0	11·0	14·5	17·13	11·81	19·6	20·7	..	..	..	..
Length: Rifled Portion, in inches	352·4	309·1	..	..	..	170·6	149·1	126·0	135·8	75·0	70·7	104·0	102·0	126·9	..	..	..	..	..	..	..	..
Length: Powder Chamber, in inches	86·8	77·1	..	..	..	49·8	53·9	39·4	19	13	13	..	..	29·7	..	..	..	..	..	..	..	..
Length: Bore, in calibres	35	35	30	..	30	35	35	35	33	27	28·7	14	14·75	26·1	35	30	37	45	45	40	42	40
No. of Grooves . . .	80	70	60	50	45	40	35	30	22	20	18	6	4	28	36	32	..	..	..	..	..	..
Depth of Grooves, in ins.	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04	0·03	0·03	0·03	0·18	0·18	..	0·06	0·06	..	..	..	..	..	..
Twist of Rifling, in cals.	From 0 to 30.								40	30	35	45	40	100 to 40	25	25	..	..	..	..	..	..
Total Weight, in tons .	47·3	32·5	20·7	11·5	8·71	6·1	4·1	2·6	2·2	0·45	0·35	12·0	9·0	4·0	4·7	2·1	4·39	4·8	2·65	0·9	0·34	0·23
Weight: Armour-piercing projectile, in lbs.	1041	694·3	438·7	253·5	187·4	130·1	86·0	53·1	39·2	..	..	250·0	180·0	78·3	84·9	43·65	100	70	55	14	6	3·3
Weight: Common Shell, in lbs.	879·6	586·4	370·4	213·8	..	112·4	75·0	47·2	36·4	14·1	11·5	250·0	180·0	73·6	65·5	34·61	..	..	..	..	..	..
Weight: Ring Segment, in lbs.	886·3	590·8	370·4	211·6	..	112·4	75·0	47·6	38·6	15·4	11·7	..	..	83·6	..	34·61	..	..	..	..	..	..
Firing Charge: Armour-piercing projectile, in lbs.	485·0	352·7	220·5	112·4	94·8	66·1	44·1	28·7	16·0	..	..	50·0	35·0	34·0	37·48	19·29	..	..	15·4	7·1	1·93	..
Firing Charge: Other projectiles	463·0	319·7	220·5	..	..	61·7	..	28·7	11·9	4·0	4·0	33·0	21·0	24·9	25·4	..	..	..	..	..	..	..
Muzzle Velocity, in feet	2034	2034	2034	2034	2034	2054	2001	1988	2000	1625	1709	1339	1339	1929	2001	1887	2264	2460	2423	2100	1870	2330
Muzzle Energy: Total, in ft.-tons	29850	24030	12580	7271	5374	3806	2386	1511	1087	258	233	3105	2239	2018	2357	1076	3554	2936	2238	428	145	124
Perforation at Muzzle, in inches	32·9	28·7	24·6	20·5	18·6	16·6	13·9	11·6	9·3	..	..	10·6	9·6	11·0	12·7	9·7	17·0	16·5	15·5	7·9	5·0	5·7
Perforation Krupp Steel, 3000 yards	11	8	6¼	4¾	4¼	3½	..	..														

Note.—The Carlos V. has 11-in. 45-cal. guns. M.V. probably 2500 f.s.

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NAVAL ORDNANCE OF SWEDEN AND OF NORWAY.

	Sweden.										Norway.								
	Armstrong.					Bofors.	New Pattern Q.F.		M. 85.	M. 89.	Modern Guns.								
Designation by Calibre, in cms.	15·2	25	25	25	24	21	15 Q.F.	12 Q.F	25	15	21	21 Q.F.	21 Q.F.	15	15 Q.F.	12 Q.F.	12 Q.F.	76mm.	7cm.
Calibre, inches	6·0	10	10	10*	9·45	8·2	5·9	4·7	10·00	6·0	8·24	8·0	8·24	5·9	..	4·7	4·7	3·0	2·8
Total Length, feet	..	33·4	29·5	28·6	27·0	30·7	22·2	17·9	28·33	16·98	24·0	27·9	31·3	19·6	..	..	..	..	..
Length: Rifled Portion of Bore, ins.	..	..	..	..	..	..	..	..	260·9	155·2	..	..	..	..	..	..	..	..	..
Length: Chamber, „	..	..	..	..	..	..	..	..	58·1	35·2	..	..	..	..	..	..	..	..	..
Length: Bore in calibres, „	50	40	32	35	32·4	43	43	43·3	32·9	32	32	40	43·8	37·1	43·8	45	43·9	40	38
Number of Grooves	..	..	..	..	..	..	..	..	42	28	..	..	..	..	..	..	..	..	..
Twist of Rifling	..	..	..	..	..	..	..	..	40	30	..	..	..	..	..	..	..	..	..
Total Weight, tons	7·8	30*	29·5	28·6	23·5	16·3	5·8	2·7	29·8	5·2	13·9	15·5	18·7	5·6	..	3·1	2·65	0·6	0·63
Weight of: Armour-piercing Shell in lbs.	100	450	450	450	400	309	100	46	449·7	100	309	210	309	112	..	46	45	12·5	10·3
Weight of: Common Shell, in lbs.	..	..	401	401	..	..	..	..	401·2	100	..	..	..	..	..	..	..	..	..
Weight of Firing Charge: Armour-piercing Shell, in lbs.	37·5	160†	242	†	182	..	18	9·15	242·5	54·0	115	82	47	58·4	..	6·6	8·4	1·7	1·9
Weight of Firing Charge: Common Shell, lbs.	..	..	..	..	..	..	..	..	242·5	..	..	..	..	..	..	..	..	..	..
Muzzle Velocity, feet.	2800	2600*	2100	2362	2051	2297	2460	2428	2100	2067	1903	2242	2300	2070	2502	2361	2570	2200	2379
Muzzle Energy, Total foot-tons	5442	21120	13760	17406	11670	11303	4196	1893	13750	2964	7760	7819	11344	3328	..	1785	2060	419	404
Perforation through Iron by Tresidder's formula	22·8	33·6	24·5	29·2	22·9	25·7	18·9	14·2	24·5	13·9	19·2	20·2	25·6	15·6	..	13·6	15·3	8·0	8·4
Perforation Krupp Steel, 3000 yds.	4¾	10½	6	8	6	6½	4½	..	6½	..	4¾	4¾	6½	..	..	..	..	..	..

* Schneider-Canet. There are also 6-pdrs., with M.V. 2165 f.s. to 2310 f.s., and 3-pdrs., with M.V. 2428 f.s. † Smokeless powder.

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UNITED STATES NAVAL ORDNANCE.

NATURE OF GUN.	Calibre.	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service Charge.		Weight of Projectile.	Muzzle Velocity (Service).	Muzzle Energy.	Perforation of Wrought Iron at Muzzle.†	Perforation of Krupp Steel at 3000yds.
								Brown Powder.	Smokeless Powder.		Brown Powder.			
	inch.	tons.	feet.	inch.	inch.		inch.	lbs.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.	inch.
3-in. (14 pr.)	3	0·87	12·5	149·7	125·5	..	21·3	..	5	14	3000	874	13·5	..
4-in. Q.F., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	..	33	2000	915	9·8	..
4-in. Q.F. Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	..	33	2000	..	9·8	..
4-in. Q.F., Mark VII., of 50 Cals.	4	2·56	17·0	200·0	168·4	..	31·6	..	15	32	2900	1,999	16·9	..
5-in. Q.F., Mark I.	5	2·8	13·5	150·3	120·8	1 in 180 to 1 in 30	27·1	26 to 29	..	60	2000	1,660	11·8	..
5-in. Q.F. Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	..	50	2300	1,834	13·2	..
5-in. Q.F., Mark V.	5	4·46	21·3	250	212·9	..	37·2	..	27	60	2900	3,503	20·5	4½
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	1 in 180 to 1 in 30	36·9	50	..	100	2000	2,773	..	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	..	100	2000	..	13·8	..
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	..	100	2000	..	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	..	100	2080	2,990	14·7	..
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	..	100	2150	3,204	15·4	..
6-in. Q.F. Gun	6	6·0	21·3	243·8	204·3	..	37·0	44 to 47	..	100	2150	3,200	15·4	..
6-in. Q.F., Mark VI.	6	8·17	25·0	293·7	245·3	..	48·4	..	46	100	2900	5,838	24·2	5
7-in. Q.F.	7	..	..	..	..	..	..	..	74	165	2900	9,646	28·7	6½
8-in. B.L.R., Mark I.	8	12·3 / 12·9	21·5	239·9	195·2	1 in 180 to 1 in 30	42·1	105 to 115	..	250 / 250	2000 / 2000	6,932	19·0	4½
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	..	..	..	..	19·0	4½
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	..	250	2080	7,498	20·1	4¾
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	..	250	2150	8,011	21·1	5
8-in. B.L.R., Mark V., of 45 Cals.	8	18·0	28·6	335·0	271·0	..	64·0	..	115	250	2800	13,602	31·4	8
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	1 in 180 to 1 in 35	57·2	225 to 240	..	500	2000	13,864	24·0	6½
10-in. B.L.R., Mark I., of 35 Cals.	10	27·1 / 28·2	30·5	343·8	283·7	zero to 1 in 25	57·2	..	..	500	2060	14,709	25·0	6¾
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	zero to 1 in 26·8	57·2	..	..	500	2000	13,864	24·0	6½
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	..	500	2100	15,285	25·8	7
10-in. B.L.R., Mark III., of 40 Cals.	10	33·4	33·3	389·0	313·4	..	75·6	..	240	500	2800	27,204	42·0	12
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	..	850	2100	25,985	30·8	9
12-in. B.L.R., Mark III., of 40 Cals.	12	52	41·8	480·1	388·1	..	91·9	..	350	850	2800	46,246	47·2	16
13-in. B.L.R., Mark I. and II.	13	60·5	40·0	454·5	370·5	..	80·9	..	230	1100	2100	33,627	33·5	11

NOTE.—The weight of fixed ammunition for Q.F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively.

† By Tresidder's formula.

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ELSWICK GUNS.

This Table is supplied by the Manufacturers.

												Jointed Gun	Field.	Horse Artillery.	Field.	Howitzer.			Howitzer.	Howitzer.				Field Position.	Howitzer.	Howitzer.				
Diameter of Bore, ins.	1·46	1·46	1·85	1·85	1·85	1·85	2·24	2·24	2·953	3	3	3	3	3	3·3	4	4	4	4·3	4·7	4 7	4·7	4·7	5	5	6	6	6	6	7·5
do. do. mm.	37	37	47	47	47	47	57	57	75	76	76	76	76	76	84	102	102	102	109·2	120	120	120	120	127	127	152	152	152	152	190
Length of Bore, cals.	25	45	40	50	50	46	40	50	14·13	40	50	19·2	28	23	28	8·75	40	50	12·5	12	40	45	50	32	8·4	12·2	40	45	50	45
Weight of Gun	lb. 79	lb. 268	lb. 506	lb. 1067	lb. 852	lb. 560	lb. 840	cwt. 10¼	lb. 210	cwt. 12	cwt. 18¼	cwt. 4	cwt. 7¼	cwt. 6	cwt. 9	lb. 220	cwt. 26	cwt. 42	cwt. 7	cwt. 8	cwt. 42	cwt. 53	cwt. 66	tons 2	cwt. 9	cwt. 20	tons 6·6	tons 7·35	tons 8·75	tons 13·8
do. Projectile, lbs.	1·1	1·5	3·3	3·3	3 3	3·3	6	6	11·75	12½	12·5	12·5	14·3	12·5	18·5	20	31	31	40	35	45	45	45	60	50	100	100	100	100	200
do. Cordite Charge	oz. 1·125	oz. 4·5	oz. 7·94	lb.oz. 1 4¾	...	...	oz. 9·2	...	oz. 7¼	lb.oz. 1 10	lb.oz. 3 4	...	...	...	lb.oz. 1 3¾	...	...	...	oz. 15·75	...	lb.oz. 5 5	lb.oz. 8 2½	..	lb. 8·5	oz. 11·5	...	lb. 18·3	lb. 26	lb. 36	...
do. M.D. do. ...	...	...	...	1 6	oz. 15·0	oz. 10·0	...	lb.oz. 1 3	...	2 0	4 0	oz. 13¾	oz. 20½	lb.oz. 1 4	1 8	oz. 9½	lb 5½	lb. 11	...	lb.oz. 1 4½	...	9 4	lb.oz. 15 0	lb.oz. 9 8	...	lb.oz. 3 5	22	31	34	lb. 75
Muzzle Velocity, f.s.	1540	2300	2132	2800	2700	2300	1968	2400	1100	2210	2800	1458	1755	1700	1635	950	2300	3000	980	1150	2200	2570	3000	2115	782	1000	2500	2800	2930	2850
Muzzle Energy, f.t.	18	55	104	179	166	121	161	240	98	423	680	185	305	250	336	125	1137	1934	266	321	1510	2061	2808	1861	212	693	4334	5436	5952	11264
Penetration at Muzzle, ins.	1·9	4·3	5·2	7·8	7·4	5·7	5·6	8·0	...	8·8	11·6	...	...	...	...	...	...	16·0	...	...	11·6	15·2	19·4	13·0	...	...	19·5	23·1	24·8	30·4
Rounds per Minute ...	...	25	25	25	25	25	25	25	20	20	20	15	15	20	20	...	12	12	...	...	12	12	12	10	...	...	9	9	9	6

Diameter of Bore, ins.	7·5	8	8	8·24	9·2	9·2	10	10	10	12	12	12	12
do. do. mm.	190	203	203	210	234	234	254	254	254	305	305	305	305
Length of Bore, cals.	50	45	50	44	45	50	40	45	50	40	40	45	50
Weight of Gun	tons 15	tons 18·0	tons 21	tons 18·1	tons 26·75	tons 28	tons 31	tons 36·25	tons 36	tons 48·5	tons 51	tons 59·3	tons 69·0
do. Projectile, lbs.	200	250	250	308·6	380	380	450	500	500	850	850	850	850
do. Cordite Charge	...	...	...	lb. 47	...	...	lb. 81·5	...	...	lb. 141	...	...	...
do. M.D. do. ...	lb. 77·5	lb. 80	lb. 85	lb. 52	lb. 122	lb. 136	86·5	lb. 167	lb. 180	155	lb. 260	lb. 286	lb. 318
Muzzle Velocity, f.s.	2950	2800	2950	2300	2750	3000	2400	2800	2900	2400	2650	2800	2960
Muzzle Energy, f.t.	12068	10872	12069	11320	19926	23712	17973	27181	29157	33949	41386	46208	51640
Penetration of Muzzle, ins.	32·0	32·2	34·8	27·0	35·9	39·8	29·9	40·9	42·95	38·4	44·6	48·5	52·5
Rounds per Minute ...	6	5	5	5	4	4	3	3	3	2	2	2	2

SOME RESULTS ACTUALLY OBTAINED UNDER SERVICE CONDITIONS AT A TARGET.

12-in. gun—8 rounds in 2 minutes 10 seconds from 1 turret (pair of guns); 16 rounds in 2 minutes 45 seconds from two turrets (four guns).

9·2-in. gun—57 rounds in 2 minutes from six guns; 44 rounds in 2 minutes from six guns; 13 rounds in 2 minutes from two guns.

7·5-in. gun—38 rounds in 1 minute 45 seconds from four guns; 35 rounds in 1 minute 45 seconds from four guns.

6-in. gun—74 rounds in 1 minute from 10 guns; 78 rounds in 1 minute from ten guns.

4·7-in. gun—79 rounds in 1 minute from eight guns.

4-in. gun—59 rounds in 45 seconds from eight guns.

12 pr. gun—10 rounds in 31 seconds from one gun.

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VICKERS, SONS & MAXIM'S GUNS AND MOUNTINGS.

This Table is supplied by the Manufacturers.

		37 mm. 30 cal.	37 mm. 42·5 cal.	3-pdr. 50 cal.	6-pdr. 50 cal.	Mountain. 2-in.-12·4-pr. 14·3 cal	Field. Light. 3-in. 22 cal.	Field. Heavy. 2·95-in. 30 cal.	3-in. Semi-Aut. 50 cal.	4-in. 50 cal.	4·33-in. Howitzer. 13·5 cal.	4·7-in. 45 cal.	4·7-in. 48·4 cal.	14 cm. 45 cal.	6-in. 45 cal.	6-in. 50 cal.	7·5-in. 45 cal.	7·5-in. 50 cal.	8-in. 48·5 cal.	9·2-in. 47 cal.	9·2-in. 50 cal.	10-in. 45 cal.	10-in. 48·6 cal.	12-in. 45 cal.	12-in. 50 cal.
Gun.	Diameter of Bore . .ins.	1·457	1·457	1·85	2·244	3	3	2·95	3	4	4·33	4·724	4·724	5·512	6	6	7·5	7·5	8	9·2	9·2	10	10	12	12
	Length of Bore . .ins.	43·5	62	92·5	112·2	42·94	64·96	87·65	150	201·15	58·45	212·6	228·45	248	269·5	300	337·5	375	388·75	429·3	460	450	486	540	600
	Length of Gun . .ins.	73·75	94	98·9	118·6	47·23	69·3	91·9	156·995	208·45	63·55	220	236·2	257·7	279·2	310·07	349·2	386·7	400	442·35	473	464·6	500	557·55	617 7
	Maximum pressure in Chamber, tons per sq.in.	13	14	17	16	12	16	13·5	17	18	12·5	17	18	16·5	17·75	18	18	17·5	18	18	18	18	18	18	18·5
	Weight of Charge lbs.	·0782	·1875	1·066	1·55	·5	1	1·33	3·625	11·25	1·0	19	17	21·875	35·25	43	78·25	80·03	90	170·5	184	190·5	172	356	344
	Weight of Projectile lbs.	1	1·25	3·3	6	12·5	12·5	14·3	12·5	31	35·27	45	45·14	88·19	100	100	200	200	216·7	380	380	478·4	496 6	850	850
	Weight of Gun . . .	c. q. l. 3 2 24	c. q. l. 5 1 19	c. q. l. 5 2 4	c. q. l. 9 1 5	c. q. l. 2 1 23	c. q. l. 1 2 0	c. q. l. 0 8 0	c. q. l. 15 19 0	t. c. q. 0 2 1	c. q. l. 3 7 1	t. c. q. 3 3 3	t. c. q. 3 2 0	t. c. q. 5 18 0	t. c. q. 7 8 2	t. c. q. 7 16 0	t. c. q. 14 0 2	t. c. q. 16 0 0	t. c. q. 14 3 0	t. c. q. 28 1 0	t. c. q. 27 16 1	t. c. q. 34 17 0	t. c. q. 27 17 0	t. c. q. 57 14 0	t. c. q. 65 17 0
	Muzzle Velocity . .f.s.	1800	2300	2800	2600	1150	1600	1706	2700	3030	1015	2925	3050	2860	3012	3190	2875	3007	3090	3025	3070	2850	2863	2950	3010
	Muzzle Energy . .f.t.	22·5	45·85	179·4	281	115	220	289·2	632	1975	267	2670	2910	4990	6290	7056	11465	12540	14350	24110	24835	26945	28225	51290	53400
	Penetration of Wrought Iron Plate at Muzzle. Gavre formula . .ins.	1·9	3·3	6·7	7·5	..	..	..	9·65	16·0	..	16·65	17·8	22·1	23·65	25·8	28·75	30·75	31·5	39·25	39·95	38·9	40·2	50·65	52·1
	Penetration of Mild Steel Plate at Muzzle. Gavre formula . .ins.	1·5	2·6	5·1	5·4	..	..	..	7·5	12.4	..	12·9	13·8	17·1	18·4	20	22·25	23·7	24·4	30·45	31·0	30·1	31·15	39·25	40·4
	Penetration of Hard Steel Plate at 3000 yards, Gavre formula . ins.	..	..	..	..	..	..	..	..	..	..	..	4·5	6·2	6·3	7·2	8 9	9·35	9·8	13·35	13·75	13·8	14·65	19·5	20·0
	Rounds per minute . .	300	300	30	28	20	20	20	25	15	..	12	12	10	10	10	8	8	6	4	4	3	3	2	2
Mounting.							Weight of carriage without limber.	Weight of equipment with 36 rounds.																	
	Weight of Mounting complete with Shield . .	c. q. l. 4 1 10	c. q. l. 3 2 5	c. q. l. 11 3 0	c. q. l. 14 2 0	c. q. l. 7 3 0	c. q. l. 11 2 0	t. c. q. 1 17 2	t. c. q. l. 1 0 2 0	t. c. q. l. 2 0 1 0	c. q. l. 17 3 0	t. c. q. l. 3 13 3 0	t. c. q. l. 5 9 2 0												
	Thickness of Shield .ins.	¼	no	·25	no	·1	·125	·125	no	no	no	2 & ·313	3												
	Weight of Shield . . .	q. l. 3 11	shield	c. q. l. 1 0 0	shield	q. l. 1 17	q. l. 2 0	c. q. l. 1 2 0	shield	shield	shield	c. q. l. (17 0 0) (1 1 0)	t. c. q. l. 1 12 2 0												
	Angle of Elevation . .	16°	13°	20°	20°	25°	16°	16°	20°	15°	50°	20°	20°												
	Angle of Depression . .	25°	25°	20°	10°	15°	6°	8°	10°	10°	5°	7°	10°												

Depending on type of Mounting used.

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SCHNEIDER - CANET GUNS.

The information in this Table is given by the Manufacturers.

Calibre, in millimètres.	305		274·4		240		210		200		175		150		120		100		75		65		57		47	37
Calibre, in inches	12·0	12·0	10·9	10·9	9·4	9·4	8·3	8·3	7·9	7·9	6·9	6·9	5·9	5·9	4·7	4·7	3·9	3·9	2·9	2·9	2·5	2·5	2·21	2·21	1·8	1·4
Length, in calibres	45	50	45	50	45	50	45	50	45	50	45	50	45	50	45	50	45	50	50	60	50	60	50	60	60	60
Weight, in tons	52·9	57·3	38·5	41·7	25·8	27·9	17·3	18·6	14·9	16·2	10·0	10·8	6·3	6·8	3·2	3·5	1·9	2·0	·85	1·2	·55	·76	·45	·55	·30	·17
Weight of A.P. Projectile, lbs.	826	826	606	606	407	407	275	275	231	231	165	165	99	99	48	48	28·6	28·6	14·3	14·3	8·8	8·8	6	6	3·3	1·76
Weight of Charge	Not stated																									
Muzzle Velocity, ft.-secs.	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2952	3116	2871	3035	2952	3116	2952	3116	3116	3116
Muzzle Energy, ft.-tons	50007	55717	36670	40859	24667	27487	16667	18572	14002	15601	10000	11143	6001	6686	2932	3268	1734	1931	820	917	533	594	362	400	223	119
Perforation of Steel at muzzle (ins.)	38·3	41·6	34·6	37·4	30·1	32·3	26·2	28·3	24·3	26·3	22·1	23·9	18·2	20·1	13·9	15·0	11·6	12·5	9·3	10·0	7·9	9·1	7·1	7·5	5·9	5·0
Perforation of Steel at 3000 yards (ins.)	29·3	31·9	25·5	27·8	21·2	23·1	17·5	19·2	16·1	17·3	13·8	15·2	10·2	11·8	6·4	6·9	4·6	4·9	..	..	..	..	..	..	..	..

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KRUPP QUICK-FIRING GUNS, Mark 1901.

Tables supplied by Manufacturers.

NAVAL GUNS.

Calibre, in centimètres	7·5			10·5			12			15			21			24			28			30·5		
Calibre, in inches	2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01		
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·00	24·44	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1488	1711	1936	3748	4189	4740	5512	6283	7055	10582	12015	13558	29321	33279	37258	44092	50265	56438	70105	79807	89507	90609	103174	120141
Weight of Gun, in tons	0·66	0·76	0·86	1·67	1·86	2·11	2·45	2·79	3·14	4·70	5·34	6·03	13·03	14·80	16·56	19·60	22·34	25·09	31·16	35·48	39·79	40·28	45·86	51·45
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·77	3·12	3·54	10·47	12·57	14·33	15·66	17·97	20·62	29·99	34·40	39·47	82·47	94·59	108·71	124·58	143·10	164·27	198·41	227·07	262·35	255·73	293·21	337·30
Muzzle Velocity, in ft.-secs.	2690	2890	3068	2835	3022	3199	2877	3038	3225	2854	3008	3196	2851	3015	3196	2854	3018	3199	2854	3018	3202	2854	3018	3199
	2388	2566	2723	2500	2661	2822	2539	2677	2841	2556	2697	2858	2559	2707	2868	2533	2687	2845	2523	2664	2835	2526	2674	2838
Muzzle Energy, total ft.-tons	576	665	749	1720	1952	2191	2659	2969	3340	5099	5680	6389	14037	15684	17620	21169	23718	26655	33561	37595	42435	43564	48728	54859
Perforation through Steel, in ins.	7·13	7·91	8·58	10·87	11·92	12·93	12·87	13·90	15·15	16·15	17·41	18·98	23·20	25·13	27·30	26·96	29·20	31·73	31·80	34·45	37·48	34·94	37·84	41·10
Perforation through Iron, Tresidder's formula	9·9	11·0	11·7	14·7	17·24	18·77	18·35	19·91	21·77	22·66	24·52	26·84	31·73	34·51	37·65	36·47	39·66	43·27	42·52	46·28	50·57	46·42	50·47	55·08
Perforation Krupp Steel, 3000 yards	..	..	..	..	..	..	3·52	3·74	4·02	4·98	5·29	5·66	8·14	8·65	9·22	9·84	10·45	11·13	12·11	12·86	13·70	13·58	14·41	15·33

COAST GUNS.

Calibre, in centimètres	7·5			10·5			12			15			21			24			28			30·5		
Calibre, in inches	2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01		
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·00	24·44	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1861	2094	2326	4519	5115	5688	6724	7606	8188	12897	14661	16314	35715	40344	44974	53792	60847	67902	85538	96782	108025	110671	125001	139772
Weight of Gun, in tons	0·83	0·93	1·03	2·01	2·27	2·53	2·99	3·38	3·77	5·73	6·52	7·25	15·88	17·93	19·99	23·92	27·05	30·18	38·02	43·02	48·02	49·20	55·57	62·13
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·99	3·35	3·76	11·80	13·45	15·32	17·53	19·96	22·93	33·52	38·15	43·88	92·59	105·40	120·83	140·02	159·42	182·57	222·67	253·53	291·00	286·60	326·28	374·78
Muzzle Velocity, in ft.-secs.	2876	2999	3123	2930	3107	3281	2920	3097	3268	2882	3068	3242	2887	3068	3245	2897	3074	3248	2897	3074	3251	2894	3068	3248
	2664	2775	2885	2582	2740	2894	2572	2733	2887	2589	2753	2900	2592	2756	2913	2576	2733	2887	2562	2720	2871	2562	2720	2877
Muzzle Energy, total ft.-tons	620	703	795	1836	2065	2307	2736	3082	3429	5228	5905	6583	14425	16232	18168	21815	24557	27430	34690	39047	43564	44855	50341	56473
Perforation through Steel, in ins.	7·52	8·23	8·98	11·40	12·40	13·40	13·15	14·29	15·43	16·42	17·91	19·37	23·62	25·76	27·91	27·54	29·98	32·43	32·48	35·37	38·31	35·63	38·71	42·01
Perforation through Iron, Tresidder's formula	10·5	11·3	12·0	16·46	17·97	19·50	18·76	20·49	22·21	23·05	25·24	27·42	32·34	35·42	38·53	37·29	40·76	44·27	43·51	47·56	51·73	47·39	51·72	56·35
Perforation Krupp Steel, 3000 yards	..	..	..	..	..	..	3·55	3·83	4·08	5·05	5·40	5·76	8·25	8·81	9·37	10·00	10·66	11·32	12·30	13·11	13·92	13·78	14·66	15·60

BETHLEHEM STEEL CO.

ORDNANCE.

This Table is supplied by the Manufacturers.

Calibre.	Length of bore.	Calibre.	Weight of gun.	Weight of projectile.	Muzzle velocity.	Muzzle energy.	Perforation of wrought iron.*	Perforation (3000 yds.) of K.C. armour by capped A.P. shell, normal impact.	Limit beyond which capped A.P. shell will not perforate K.C. plate.	
									12-in. plate.	7-in. plate.
inches.	cals.	cms.	lbs.	lbs.	feet per second.	foot-tons.	inches.	inches.	yards.	yards.
1·457	46	3·7	120	1	2300	37	3·5	..	..	..
1·851	46	4·7	550	3	2600	142	6·4	..	..	.
2·244	50	5·7	960	6	2400	240	7·3	..	..	..
3	50	7·62	1900	13	2800	707	11·7	..	..	..
			tons.							
4	40	10·16	1·6	33	2250	1,159	11·6			
4	50	10·16	2·6	33	2900	1,924	17·0	..	.	..
4·724	50	12·0	4·2	45	2900	2,623	18·3	..	..	..
5	45	12·7	3·4	60	2500	2,599	16·5	..	..	..
5	50	12·7	4·75	60	2900	3,490	20·5	3·9	..	..
6	45	15·24	7·2	105	2600	4,967	21·2	4·6	..	..
6	50	15·24	8·4	105	2900	6,180	24·9	5·7	..	1,820
7	45	17·78	12·7	165	2800	8,967	27·3	6·5	..	2,630
7	50	17·78	14·5	165	2900	9,619	28·8	8·1	..	4,010
8	45	20·32	18·6	250	2800	13,587	31·5	8·5	..	4,310
10	45	25·4	35·4	500	2800	27,174	39·8	10·3	1,780	6,070
12	45	30·48	53·0	850	2800	46,195	47·4	15	5,280	11,100
18	28	45·72	60·0	2000	2250	70,185	42·7	19·5	8,870	Max. Range
								19·9	9,500	Max. Range

* By Trosidder's Formula.

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Table Relating to Conversion of Measures.

Length.

Metric to English. | English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards in 2354 mètres (see cols. I. & II.).	of feet in 12·4 mètres (see cols. I. & III.).	of inches in 30·5 centimètres (see cols. I. & IV.). Note, 1 m.=100 cm.	of mètres in 1026 yards (see cols. V. & VI.).	of mètres in 1742 feet (see cols. VII. & VIII.).	of centimètres in 17·72 ins. (see cols. IX. & X.)
mètres. yards.	mètres. feet.	cms. inches.	yards. mètres.	feet. mètres.	inches. cms.
2000=2187·3	10 =32·809	30·0=11·811	1000=914·38	1000=304·79	10·0 =25·400
300= 328·09	2 = 6·562	·5= ·197	20= 18·29	700=213·36	7·0 =17·780
50= 54·68	0·4= 1·312		6= 5·49	40= 12·19	0·7 = 1·778
4= 4·37				2= 0·61	·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. | English to Metric.

I. Kilo-grammes	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoir-dupois.	VIII. Kilo-grammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons in 35 milliers (see cols. I. & II. Note, 1000 kg. =1 millier).	of pounds in 56·3 kilo-grammes. (see cols. I. & III.).	of grains in 120 grammes (see cols. I. & IV. Note, 1000 grms. = 1 kg.)	of milliers in 38 tons (see cols. V. & VI.).	of kilogrammes in 68 pounds (see cols. VII. & VIII.).	of grammes in 85 grains (see cols. IX. & X.).
milliers. tons	kgrms. lbs.	grammes. grains.	tons. milliers.	lbs. kgs.	grains. grammes.
30 = 29·53	50 =110·231	100=1543·23	30 = 30·48	60 = 27·216	80 = 5·184
5 = 4·92	6 = 13·228	20= 308·65	8 = 8·13	8 = 3·629	5 = 0·324
∴ 35 = 34·45	0·3= ·661				
	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy = 1 pound avoirdupois.

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PRESSURE.

Metric to English.			English to Metric.			Atmospheric to English.		English to Atmospheric.	
I. Kilogrammes per square centimètre.	II. Pounds per square inch.	III. Tons per square inch.	IV. Pounds per square inch.	V. Kilogrammes per square centimètre.	VI. Tons per square inch.	VII. Kilogrammes per square centimètre.	VIII. Atmospheres.	IX. Tons per square inch.	X. Tons per square inch.	XI. Atmospheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152·38
2	28·446	·01279	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21003	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371·43

Note.—One atmosphere is taken to be 14·7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the value of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).		of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).		of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).		of kilogrammes per square centimètre in 18 3 tons per square inch (see cols. VI. & VII.).		of tons per square inch in 3454 atmospheres. (see cols. VIII. & IX.).		of atmosphere in 14·6 tons per square inch (see cols. X. & XI.).	
kgs. per sq. cm.	lbs per sq. in.	kgs. per sq. cm.	tons per sq. in.	lbs. per sq. in.	kgs. per sq. cm.	tons per sq. in.	kgs. per sq. cm.	atmospheres.	tons per sq. inch.	tons per sq. in.	atmospheres.
30 =	426·68	3000 =	19 05	10 =	·7031	10 =	1574·9	3000 =	19·69	10 =	1523·8
2 =	28·45	200 =	1·27	5 =	·3516	8 =	1259·95	200 =	1·31	4 =	609·5
0·1 =	1·42	10 =	·06			0·3 =	47·25	50 =	·33	0·6 =	91·4
∴ 32·1 =	456·55	∴ 3210 =	20·38	∴ 15 =	1·0547	∴ 18·3 =	2882·10	∴ 3254 =	21·36	∴ 14·6 =	2224·7

ENERGY.

Metric to English.		English to Metric.	
I. Mètre-tons.	II. Foot-tons.	III. Foot-tons.	IV. Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).		of mètre-tons in 3592 foot-tons (see cols. III. & IV.).	
mètre-tons.	foot-tons.	foot-tons.	mètre-tons.
4000 =	12916·2	3000 =	929·1
300 =	968·72	500 =	154·84
60 =	193·74	90 =	27·87
7 =	22·60	2 =	·62
∴ 4367 =	14101·26	∴ 3592 =	1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versa*.

1 inch steel = 1¼ inches iron;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9{\cdot}4 \times \frac{4}{5} = 7{\cdot}52 \text{ inches steel};$$

or, given 5·2 inches steel,

$$5{\cdot}2 \times \frac{5}{4} = 6{\cdot}5 \text{ inches iron.}$$

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PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

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STATEMENT showing the GROSS EXPENDITURE on NAVAL SERVICES for the YEARS 1904-1905 to 1906-1907, together with the ESTIMATED GROSS EXPENDITURE for 1907-1908 and 1908-1909.

	ACTUAL EXPENDITURE.			ESTIMATED EXPENDITURE.	
	1904-1905.	1905-1906.	1906-1907.	1907-1908.	1908-1909.
	£	£	£	£	£
Gross Expenditure (Navy Vote)...	38,293,738	34,861,443	33,262,649	32,911,046	33,942,003
Abate: Annuity under the Naval Works Acts, 1895 to 1905	634,238	1,015,812	1,094,309	1,214,402	1,264,032
	37,659,500	33,845,631	32,168,340	31,696,644	32,677,971
Expenditure from Loans...	3,402,575	3,313,601	2,431,201	1,135,000	896,925
Value of Stores drawn from stock, without replacement, in aid of cash expenditure ...	—	768,850	1,024,200	1,241,800	500,150
Expenditure on behalf of Naval Services from Votes of other Departments	373,686	372,695	354,084	370,360	382,742
TOTAL	41,435,761	38,300,780	35,977,825	34,443,804	34,457,788

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First Lord's Statement explanatory of Navy Estimates, 1908-9.

THE Estimates for 1908-9 amount to £32,319,500 as opposed to £31,419,500 for the current year.

A statement of the gross expenditure on the Naval Service * has been placed at the beginning of the printed Estimates, which shows that although Parliament is asked to vote £900,000 more money this year than last, the total outlay for the year will stand at a figure of £13,984 only in excess of that for 1907-08.

It is an accepted axiom in the finance of the Navy that the governing factor is the provision for new construction, but for the next financial year a variety of unusual causes combine to create an actual increase in the cash provision which Parliament is asked to vote for the Navy, in spite of the fact that the new building programme put forward by the Admiralty is exceedingly modest.

In 1904-5 the Estimates stood at £36,889,000. The succeeding years have shown successive reductions of £3,500,000 in 1905-6, £1,520,000 in 1906-7, and £450,000 in 1907-8 (as I explained in my Statement last year, the reduction then was really £1,427,091, in consequence of the transfer of loan expenditure to the Works Vote).

In each of these years of falling Estimates the Admiralty were able to reduce the cash provision for stores by, on the average, £1,000,000—the figure last year being £1,241,800—owing to the large redundancy of stores created by the reforms in dockyard administration and by the redistribution of the Fleet, which were determined on and carried out by the late Board of Admiralty. Of these surplus stocks about half a million's worth still remain and will be exhausted during the coming year.

A fresh sum of some £700,000 has therefore to be provided to buy the balance of Naval stores required for 1908-9. By 1909-10 surplus stocks will have practically disappeared, and then the whole of the stores required for the Fleet will have to be provided for in cash by Parliament.

Apart from the cessation of the abnormally low cash provision for stores, there are certain items in the Estimates which show an increase over which the Board of Admiralty have no control whatever. Improvements in pay granted in previous years increase the

* See previous page.

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Pay Vote by £150,000; the Pension Votes are £70,000 higher; a sum of £300,000 has to be found to provide the balance of £500,000 for cooling the magazines on board His Majesty's ships—a service announced to the House of Commons in last year's Estimates Debate; the Cunard subsidy for the Lusitania and Mauretania stands now at the full amount of £150,000 per annum; prices have gone up, by £284,000 in coal alone; and the annuity in repayment of advances under the Naval Works Loan Acts now reaches the large sum of £1,264,000. In fact, Parliament and the Board are faced with automatic or uncontrollable increases which make any reduction of the total Estimates impracticable.

By strict economy the Admiralty have been able to bring down the inevitable increase to £900,000, the figure we now ask Parliament to sanction.

It is interesting to recapitulate the salient features of Naval expenditure during the last eight years:—

	£
The total net sum voted for Naval Services in 1900–01 was	30,041,900
This was increased by about a million for the two subsequent years, and in 1903–04 it advanced to £35,727,500. In 1904–05 it reached its highest limit, namely . .	36,889,500
In 1905–06 there was a decrease of . .	3,500,000
And in the two following years an aggregate decrease of	1,970,000
The increase proposed in 1908–09 is .	900,000
Bringing the net total to	32,319,500
Now taking loan money:—	
The annuity under the Naval Works Acts first became finally chargeable to Naval funds in 1902, the amount for that year being	122,255
This has increased each year on account of fresh advances of loan money, until it has reached a total of—for 1908–09 .	1,264,032
The expenditure on Works under the Naval Works Acts began in 1895–96, in which year it amounted to	721,099
It gradually increased until in 1904–05 it amounted to	3,402,575
In the last completed year, 1906–7, it had fallen to	2,431,201

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	£
It is estimated that the outlay from loan in 1907–08 will be	1,135,000
And in 1908–09	896,925

Shipbuilding and Repairs.

New construction for the year will cost £7,545,202 as against £8,100,000 for 1907–08. The continuous fall in the estimate for new construction from the maximum of £11,654,176 in 1904–05 is thus carried on, and Parliament is asked to vote £4,108,974 less than it was four years ago. Of this sum of £7,545,202, £6,795,202 will be spent on the continuation of ships already under construction, and £750,000 in beginning work on ships of the new programme, which is composed as follows:—

1 Battleship (improved Dreadnought class);
1 Large Armoured Cruiser;
6 Fast Protected Cruisers;
16 Torpedo Boat Destroyers;

and a number of Submarine Boats estimated to cost £500,000 in all.

This programme suffices for 1908–9; whether and to what extent it may be necessary to enlarge it next year, or in future years, must depend upon the additions made to their naval force by Foreign Powers. His Majesty's Government have every intention of maintaining the standard of the British Navy which has hitherto been deemed necessary for the safeguarding of our national and imperial interests.

Between April 1st, 1907, and March 31st, 1908, the following ships will have been completed and become available for service:—

1 Battleship (Lord Nelson).
3 Armoured Cruisers (Warrior, Shannon, and Minotaur).
3 Torpedo Boat Destroyers (Cossack, Mohawk, and Tartar).
10 Torpedo Boats (of the Coastal Destroyer type).
8 Submarines.
1 Repair Ship (Cyclops) and the New Royal Yacht Alexandra.

On April 1st, 1908, there will be under construction:—

7 Battleships.
4 Armoured Cruisers.
1 Unarmoured Cruiser.
10 Torpedo Boat Destroyers.
20 Torpedo Boats (of the Coastal Destroyer type).
18 Submarines.

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This year again there has been some delay in the completion of contract-built ships, owing to labour disputes between employers and their men in the private shipbuilding yards. A continuance of this delay may involve a modification in the numbers of ships given above.

Several incidents occurred early in 1907 which gave us cause to suspect that the method of storing cordite in magazines on board ship required alteration, in order to meet certain dangers that had been discovered to arise from cordite which is exposed to a high temperature. The matter did not admit of delay, and the Admiralty decided, with the approval of a strong scientific committee, presided over by Lord Rayleigh, to fit the cordite magazines with cooling apparatus, and to destroy all cordite that had been long in a hot climate. The cooling apparatus is expensive, and the work when completed will have cost £500,000; but the necessity for dealing promptly with the danger will not need further statement. The progress on this work has been very prompt and satisfactory, and the amount estimated for it during the year will be fully spent. It has necessitated an increase in the numbers of men employed in the dockyards, and a slight further increase was also necessary to deal with the large number of casualties to torpedo craft and other vessels after the Fleet Exercises had terminated. The remedy of these defects is nearing completion, and the present progress of repairs is now in a normal and satisfactory condition.

The cost of maintaining the torpedo craft in an efficient condition is increasing as the vessels get older, and many of them are due for large boiler repairs during the present year. Before carrying out this work in the older ones a careful survey will be made to ensure that they are worth this expenditure. The increasing power of machinery and boilers, due to the higher speeds adopted during the past decade, is also throwing an increasing share of repair work on the engineering side of the dockyards and necessitating an increase in the numbers of men therein employed, though no corresponding increase is required on the constructive side at present. Although no important re-constructive work is contemplated, many minor but very important alterations are being carried out gradually with the object of improving the general fighting efficiency of the Fleet. Wireless telegraphy is being adopted in most of the later destroyers, and the improvements in the system adopted in our big ships have required constructive alterations in them to enable the instruments to be fitted. These alterations require considerable time and money to carry out, in view of the great number of vessels involved.

Excellent work continues to be done by repair ships and the artificers of the Fleet in correcting small defects which might other-

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wise develop to such an extent as to necessitate dockyard assistance before the annual refit was due; but nevertheless, for the reasons I have given above, an increased provision of £700,000 for repairs is needed for the coming year.

We have begun to build submarines in the Royal Dockyards, a step which, besides affording desirable work to them, will be a check on contract prices.

The Admiralty have come to an arrangement with the armour-plate manufacturers for a considerable reduction in the price which is paid for armour plates, and this will take effect in the construction of the new armoured ships of the current year's programme.

General Progress of Recent Reforms.

A review of the memoranda issued by the Admiralty during the last few years discloses a series of important changes and alterations affecting all branches of His Majesty's Naval Service. These are all, in my opinion, entirely well conceived and salutary. Time is now required for the Service to digest and assimilate the new arrangements, and caution will, therefore, be used in bringing forward further schemes at present.

Under the nucleus crew system the chief executive officers and more important ratings are always on board the ships; from time to time the crews are made up to full complement and are given sea-going practice; the boilers and machinery are always maintained in good order, so as to be ready for sudden mobilisation.

The rapidity and certainty with which the nucleus crew ships can be fully manned has been illustrated signally by the recent exercises of mobilisation at Devonport, Portsmouth, and Chatham.

It has been alleged that the Admiralty have no war plans properly worked out, nor strategical operations thoroughly elaborated; this is a baseless allegation. Such plans are in the possession of the Admiralty in abundant number to meet all probable emergencies. The details of these plans cannot, of course, be made public, for their successful operation in actual warfare must largely depend upon their secrecy.

The new disposition of the Atlantic Fleet, with its base at Berehaven and its repairing dockyard at Gibraltar, and the development of the Home Fleet have been notable examples of the progress of the last two years. The fully manned portion of this Fleet at present has its base at the Nore, and is now in full working order, though not yet up to its intended full strength. It will consist this summer of twelve of the latest battleships and armoured cruisers,

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with destroyer and submarine flotillas attached, and the nucleus crew ships at the three Home Ports ready for rapid mobilisation.

The remarkable results which have during the last year been returned of the gunnery practice carried out by our Fleets and ships all over the world are facts of great interest and worthy of congratulation. The reports of the efficiency which signalling has reached in the Naval Service, whether by the older systems or by electric and wireless telegraphic installations, are very satisfactory, and speak very highly for the intelligence and hard work of the officers and men who take charge of this important part of the service of the sea.

The new system of entry, training and education for all classes of officers in the Navy—executive, engineers and marines—instituted a little more than four years ago, is yielding good results. The first two batches of Cadets are now serving in the training cruisers Cumberland and Cornwall.

After six months' service in these cruisers, they will be drafted to ships in the seagoing Fleets, the first batch going to sea in April. In the Fleets they will be trained in a practical way as Naval officers; and after three years they will be examined in Seamanship, Navigation and Pilotage, Gunnery, Torpedo, and Engineering, and in certain optional subjects, such as Mathematics, Mechanics, Electricity, Languages, and History, the study of which at sea will be voluntary. After passing the examinations in the above subjects, they will become Sub-Lieutenants and remain at sea, receiving their promotion to Lieutenants according to the results of their examination. After serving at least two years at sea as Sub-Lieutenant and Lieutenant, a certain proportion will be selected to qualify in the separate specialist branches of the Service, in preparation for which they will then undergo courses at the Royal Naval College, Greenwich, and the specialist schools.

The officers will thus serve for 5½ years continuously at sea before they can specialise.

The Interview Committees which, since taking office, I have appointed to report on the respective qualifications of the candidates for entry as Naval Cadets, have included Admirals of the Fleet Lord Walter Kerr and Sir Edward Seymour, Admirals Sir Archibald Douglas and Sir Arthur Fanshawe, Vice-Admirals Sir John Durnford, the Right Hon. Arthur Acland, Mr. A. C. Benson, and the Headmasters of Marlborough, Wellington, Radley and Dartmouth. Their reports to me have revealed a most satisfactory unanimity of opinion as to the value and success of this method of differentiating between the merits of boys of the young age of twelve years.

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Administration.

A reform long advocated by Naval officers has been carried out this year by the transfer of the work of making contracts for Naval guns and Ordnance stores from the War Office to the Admiralty, and by the creation of a Naval Ordnance Inspection Department. The Admiralty, therefore, now for the first time have direct control and responsibility for the manufacture and supply of the guns and ammunition of the Fleet. The Army Inspection officers have done the work for the Admiralty with great ability in the past, but the growing divergence in pattern between the Stores required by the two Services and the necessity for the rapid expansion of the supply in war time, a requirement for which the War Office Staff were admittedly unable to provide, rendered the change inevitable.

I am glad to be able to report that the London County Council have accepted the solution of the difficulty with regard to the interference of their electric generating station with Greenwich Observatory, to which I referred in my statement last year.

The Admiralty Office has lost through retirement several of its Heads of Departments. Engineer Vice-Admiral Sir John Durston, K.C.B., for many years Engineer-in-Chief of the Navy, and the first holder of his present rank, has had a unique experience in the superintendence of the development of steam machinery in the Fleet. Well-deserved praise was awarded to the Transport Department by the South African War Commission for its work during that campaign. Vice-Admiral Sir George Boyes, K.C.B., who became Director while the war was in progress, and Mr. Stephen Graff, C.B., who was Civil Head of the Department throughout, have both retired this year.

The labours of the Malta Fever Commissioners have during the past year been brought to a successful termination. They have made the discovery that the milk of the goat is the chief medium by which the bacillus of Malta fever gains access to the human body. We hope that in future this disease, which in the past has committed such ravages among the crews of vessels serving on the Mediterranean Station, will entirely be banished. Since this discovery was made, and the use of goat's milk was forbidden to our seamen and marines, Malta fever has practically disappeared from among them. The Commission, working under the ægis of the Royal Society, was composed of Naval, Military, and Colonial medical officers under the chairmanship of Colonel Bruce, C.B., F.R.S., and their patient and skilled investigations merit the highest praise. Fleet Surgeons Shaw

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and Clayton, who represented the Navy on the inquiry, contributed not a little to the result.

Personnel.

The War Course College at Portsmouth, re-named the Royal Naval War College, has now been placed under the command of a Flag officer—Rear-Admiral Robert Lowry—with an increased staff of assistants, and work of the greatest value is now being carried out there, in close connection with the Naval Intelligence Department, whose Director, Captain Sir Charles Ottley, K.C.M.G., has, on appointment as Secretary of the Imperial Defence Committee, been succeeded by Captain Edmond Slade, hitherto Superintendent of the War Course College.

The report of the inter-departmental Conference on the subject of the present administration of the Coast Guard service, to which reference was made last year, has been received, and has been under consideration by the various Departments concerned. The effect of the policy upon which the report was based would be to bring about a material change in the relations of the Admiralty, Board of Customs, and Board of Trade, in regard to the carrying out of various services which have gradually been undertaken by the Coast Guard during the fifty years that it has been directly under the Admiralty; and looking to the many issues involved, the Board of Admiralty recognised that the change proposed could not take place without very careful consideration. Accordingly it was decided that no attempt should be made to provide for any new policy as regards the administration of the Coast Guard in connection with the preparation of the Estimates for 1908–09.

The new Victualling and Canteen arrangements, based upon the recommendations of a Committee presided over by Rear-Admiral Spencer H. M. Login, C.V.O., whose report has already been presented to Parliament, came into operation on October 1st last, except on some of the more distant Stations, where the change was deferred until January 1st. All the reports received are to the effect that the new arrangements are working smoothly and satisfactorily. The new victualling system is, practically everywhere, resulting in economy to the men, partly because the substitution of a fixed daily messing allowance for the varying amount formerly received under the complicated "savings system" enables them to keep closely in touch with their expenditure from day to day, and partly on account of the facilities now given to the messes for purchasing many articles of food for use on board ship from Government stocks and at Government prices. The new Canteen system, under which the

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Admiralty exercise general supervision over the Canteen arrangements throughout the Fleet, and furnish Commanding Officers with official information and assistance in connection with Canteen matters, is also working well, and seems likely to have a very beneficial effect in many ways.

As a result of the deliberations of a Committee on Pay and Allowances of Seamen of the Fleet, new regulations have been issued which will tend to improve the fitness and disciplinary position of the Petty Officers of the Royal Navy, and will ensure a higher standard of general efficiency among the more important ratings.

The annual battle practice is steadily training the Fleet for the firing conditions which would be met with in action. Each year our experience gained increases our knowledge of the practical means of developing the fire of our ships, and we are continuing to make progress in the direction of imitating more closely the actual conditions of battle. It is difficult to appreciate the revolution in Naval gunnery which has taken place in the last few years, and the labour and patience required in introducing large changes throughout a great Service like the Navy. The results obtained this year have shown that a sound knowledge of long-range shooting has thoroughly permeated the Fleet. We are therefore able, from the experience gained, to take next year several important steps as regards both this practice and additional fittings to the ships. Every endeavour is being made to assimilate our methods to war conditions, but while we are steadily developing, there is no reason to disparage our present results, which undoubtedly afford great proof of the gunnery efficiency of our various ships and Fleets, and give a measure of their capabilities in action.

In the four principal Fleets the recording of the results was placed in the hands of an independent committee, under the Inspector of Target Practice, to ensure a uniform method of assessing the number of hits obtained by each ship.

Works.

After negotiations extending over a good many months, a site has been feued on the west shore of Loch Long for the establishment of a Torpedo Range of 7000 yards length, and another has been purchased at Greenock for a Torpedo Factory, whence these weapons can readily be conveyed to the range for trial. The rapid increase in recent years of the speed and the range of action of the Whitehead Torpedo has rendered the existing ranges at Portsmouth and Weymouth wholly inadequate for their purpose, and a thorough survey

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of the coasts of the United Kingdom resulted in the selection of Loch Long as the place which would best comply with all the conditions required. Visitors to this part of Scotland need be under no apprehension that the beauties of the scenery or the convenience of access will be interfered with.

The Admiralty property at Rosyth, consisting of 1184⅕ acres, with 285 acres of foreshore, was purchased in 1903–04 for the construction of a new Naval base on the east coast. In the interval, since the completion of the purchase, the Superintending Engineer appointed in charge of Rosyth has made an extensive survey of all the great Naval establishments and building yards at home and of some abroad, in order that plans might be drawn for the laying out of Rosyth as a first-class Naval base in such a way that any particular portion might be carried out without interference with the general scheme; the intention was to avoid the repetition of the haphazard growth of a Naval dockyard port, which the history of the old establishments at Portsmouth, Devonport, and Chatham has proved to be so expensive in the past. The general scheme having been drawn up, the present Board of Admiralty have decided to take in hand the construction of a graving dock, closed basin, and an entrance lock, capable of accommodating the largest modern warships with a depôt for submarines and destroyers, and provision for oil fuel storage. The basin is to be 52½ acres in area, with accommodation for 11 of the largest ships along the quays, or 22 when double banked.

During the past year the preliminary borings have been completed, and detailed contract plans are now being prepared.

This part of the general scheme, for which the contract will shortly be let, is estimated to cost £3,000,000 for work and £250,000 for machinery—the whole to be completed in about 10 years.

The necessity for this work is apparent when it is remembered that there is no Government dockyard capable of taking ships of the Dreadnought class along the whole of the east coast of Great Britain.

Colonial Conference.

The appropriations in aid of the Navy Estimates which are contributed by the various self-governing Colonies are the same as in last year's Estimates. The discussions at the Conference with the Colonial Ministers last spring revealed the fact that there was a certain desire on the part of some of the Colonial Governments for the establishment of local defence flotillas in lieu of, or as supple-

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mentary to, the present money contributions to the Imperial Exchequer.

The Admiralty, while not desiring to withdraw from the existing agreements and arrangements, recognised that it was only natural that the Colonies should sooner or later desire to have defence forces of their own, and consequently we announced our readiness to meet the wishes of the Colonial Governments as far as possible, and to consider any alternative schemes which they might put forward.

The Prime Minister of the Australian Commonwealth has communicated to the Admiralty the outline of a scheme for the establishment of a local flotilla of destroyers and submarines, which is now under consideration. The Cape and Natal Governments have initiated legislation with the object of establishing divisions of the Royal Naval Volunteer Reserve in Cape Colony and Natal, and the Legislature of the latter Colony has passed an Act for the purpose.

Hague Conference.

A report of the conclusions of the second International Conference at the Hague has been presented to Parliament in a recent Blue Book. The action to be taken in regard to the various conventions is now engaging the consideration of the Government, and the Board of Admiralty are giving special attention to those conventions which immediately concern the operations of the Fleet, and particularly to the convention for the establishment of an International Court of Appeal in Prize cases. From a Naval point of view it is important that there should be an agreement as to the principles of International Law which should govern the decisions of an International Court in matters such as contraband and blockade.

Distribution of the Fleet.

The distribution of the Fleet has undergone no material alteration. The development of the Home Fleet is steadily proceeding and by degrees approaching its desired standard of strength.

In August last two armoured cruisers were added to the First Cruiser Squadron, and 24 destroyers, forming a "Western Group" based on Portland, were placed permanently under the orders of the Commander-in-Chief of the Channel Fleet. More recently six nucleus crew destroyers have been added to this group, with the object of forming a reserve at Portland, and so rendering the group as far as possible self-contained.

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The Channel Fleet has had its quota of destroyers brought up to thirty, and the Battle Squadron is being strengthened by the substitution of six of the Bulwark type for older vessels, so that it will in future consist of eight King Edwards and six Bulwarks.

It has recently been decided to appropriate permanently the Shearwater and Algerine for service on the West Coast of America, the Algerine being transferred from the China Station. These two vessels will be available for the Behring Sea patrol and also for occasional visits to the Pacific Islands.

An inter-departmental Conference, under the presidency of Vice-Admiral Sir Reginald Henderson, commanding the Coast Guard and Reserves, has been sitting to consider the general question of the protection to be afforded by the Navy to the fishery interests in the seas surrounding the British Isles, which involves also the question of Revenue protection afloat.

I append the usual statement of work done in the Department.

TWEEDMOUTH.

February 11th, 1908.

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STATEMENT OF WORK, &c., 1907–8.

Changes in the Composition of the Fleets.

Mediterranean.

For the greater part of the year the Battleship Squadron has consisted of six battleships of the Formidable class, but it is intended to replace four battleships of this class by four battleships of the Canopus class; the Glory has replaced the Venerable, and the Goliath will replace the Irresistible this month.

The cruisers attached to the Battle Squadron are the Diana, Minerva, Barham, and the Philomel, which relieves the Venus this month, the latter having been transferred to the Atlantic Fleet.

In the Third Cruiser Squadron the Aboukir has replaced the Carnarvon.

North America and West Indies.

(*Fourth Cruiser Squadron.*)

No change has been made in the composition of the main part of the squadron, but the Indefatigable has been joined by the Protected Cruiser Scylla to assist in duties in the West Indies.

The Protected Cruiser Brilliant was employed during the fishery season in Newfoundland waters. Prior to that she carried out a cruise on the east coast of South America. She temporarily exchanged duties with the Indefatigable in December last.

The Protected Cruiser Sappho has also been added temporarily to the Fourth Cruiser Squadron, and has spent the winter months on the Atlantic and Pacific coasts of South America.

China.

No alteration has taken place beyond the replacement of the Diadem by the Bedford.

Two sloops, three gunboats, and ten shallow draught steamers have been engaged in river work as in former years.

Australia.

No alteration has taken place in this squadron.

The Torch was temporarily commissioned for a cruise among the Pacific Islands extending from April to September, 1907.

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East Indies and Cape of Good Hope.

The only changes have been those foreshadowed in last year's statement. The Hyacinth relieved the Hermes as flagship (East Indies) in March, 1907, and the Hermes became the Flagship of the Cape Station in place of the Crescent, which returned home.

Atlantic Fleet, including Second Cruiser Squadron.

The Battle Squadron of the Atlantic Fleet has remained as re-constituted in March last; it consists of the five ships of the Duncan class and the Albion.

The cruisers attached to this squadron are the Venus and Arrogant.

The Second Cruiser Squadron, affiliated to the Atlantic Fleet, has been re-constituted, the Berwick, Black Prince, and Duke of Edinburgh having been replaced by the Antrim, Carnarvon, and Devonshire. The Drake remains the flagship.

Channel Fleet, including First Cruiser Squadron.

The Diamond has been transferred from the Atlantic Fleet to replace the Topaze, the other two cruisers attached to the Battle Squadron, Juno and Talbot, remaining unchanged.

The First Cruiser Squadron now consists of six armoured cruisers, of which the Black Prince and Duke of Edinburgh occupy the places filled at the time of the last Statement by the Devonshire and Antrim.

The Commander-in-Chief of the Channel Fleet has also under his command 24 seagoing torpedo boat destroyers with full crews, together with a reserve of six destroyers, with nucleus crews for use as required.

The vessels attached to the destroyers are the Sapphire, Sapphire II., Tyne, Aquarius, and the two scouts, Forward and Skirmisher.

The Repair Ship Assistance has been added to the Channel Fleet, which as now constituted consists of 60 vessels (excluding the Surprise, Commander-in-Chief's Despatch Vessel).

Home Fleet.

The Home Fleet has now been constituted for a year on the lines indicated in the statement last year. The Nore Battleship Division of this Fleet, consisting of six fully-manned battleships,

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will shortly include, besides the Dreadnought, the Lord Nelson and Agamemnon, whilst the Fifth Cruiser Squadron will, on the commissioning of the Minotaur and Shannon (which replaces the Leviathan), consist of six fully-manned armoured cruisers of the latest type.

The other fully-manned vessels of the Home Fleet are the Adventure, Attentive, Blenheim, Topaze, and 24 destroyers. The new Repair Ship Cyclops has been attached to the Home Fleet.

The Commander-in-Chief of the Home Fleet has also at present under his orders seven battleships, nine first-class cruisers, eight second-class cruisers, and numerous destroyers, submarines, and attached vessels, with nucleus crews ranging from three-fifths of the total complement upwards.

The Special Service vessels are additional to the above.

Cadets' Training Ships.

The Cumberland and Cornwall have been commissioned for the training of cadets entered under the new scheme of education.

Coast Guard and Fishery Service Vessels.

The torpedo gunboats Halcyon and Leda, and the Coast Guard Cruisers Squirrel and Thrush, have been employed during the year in the North Sea on sea fishery protection duties.

The Coast Guard Cruisers Argus, Fanny and Julia have been employed in the English Channel, principally off the Devon and Cornwall coasts, on sea fishery protection duties. The Argus was transferred from the North Sea to the Channel in March, 1907.

The gunboat Ringdove and Coast Guard sailing cruiser Daisy have been employed on fishery protection duties in Scottish waters, the former in the north-east of Scotland, the latter in the south-west. The Hebe was also detached for fishery and revenue protection duties in the Orkney and Shetland Islands from June to September.

The torpedo gunboat Skipjack and Coast Guard Cruiser Colleen have been employed on fishery and Coast Guard duties in Irish waters.

Special Visits.

The First Cruiser Squadron visited Jamestown, Virginia, in April last, upon the occasion of the International Exhibition held there, and later proceeded to Canadian ports.

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The Commander-in-Chief of the Home Fleet in H.M.S. Dreadnought with the battleships of the Nore Division visited the coast of Norway in June.

The Rear-Admiral Commanding the Fourth Cruiser Squadron visited Vera Cruz (Mexico) in April, 1907, and later in the year his squadron also visited Norway.

The Commander-in-Chief, Mediterranean, in H.M.S. Hussar, visited H.I.M. the Sultan of Turkey at Constantinople in September.

The Commander-in-Chief, China, visited Vladivostok in August last.

Manœuvres and Exercises.

Combined tactical and strategical exercises of the Channel and Atlantic Fleets, and the Nore Battleship Division and Fifth Cruiser Squadron, with the eastern and western group of destroyers, took place off the east coast of Scotland in October, 1907.

Tactical exercises were also carried out between June 24th and July 10th, the Fifth Cruiser Squadron and 36 destroyers of the Home Fleet being placed under the orders of the Commander-in-Chief of the Channel Fleet for this purpose.

After the inspection of the Home Fleet by His Majesty the King on August 3rd, 166 vessels of the Fleet, fully manned, were exercised for two days on leaving Cowes.

PERSONNEL.

Officers.

The organisation of the War Courses has been further developed. The increasing number of officers who wish to attend these Courses affords ample testimony to the value of the instruction given.

Regulations have been issued defining the responsibility for the efficiency of various machinery and electrical and mechanical appliances on board H.M. ships. The changes introduced are based on three general principles:—

(*a*) That those who use the machinery should be held responsible for its working, care, and maintenance.

(*b*) That the Engineering Staff should carry out large mechanical repairs to all machines.

(*c*) That the Torpedo Officer is the electrical expert of the ship, and that his staff should carry out electrical repairs.

Steps have been taken to provide for the more general supervision of Wireless Telegraphy in seagoing fleets and squadrons by

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the training of Marine officers in Wireless Telegraphy duties, who will be appointed as Assistants for Wireless Telegraphy duties, and will receive an allowance while so employed.

The number of Lieutenants employed on Physical Training duties afloat has been increased to meet the development in the system of Physical Training.

The education of Naval Cadets at Osborne and Dartmouth has proceeded satisfactorily. The first batch of Cadets entered under the new scheme of Naval Training passed out of the Royal Naval College, Dartmouth, at the end of July, after completing their four years' course. All the Cadets passed a highly satisfactory examination, the standard of knowledge reached in the several subjects being higher than was anticipated when the New Scheme of Training was instituted. These Cadets joined the Cruiser Cumberland in September for six months' training afloat before joining the general service. Similarly the batch of Cadets who passed out in December joined the Cruiser Cornwall in January.

The construction of a new infectious hospital, gymnasium, and racquet courts at Osborne is proceeding.

Arrangements have been finally concluded for establishing a system of deferred pay or annual bonus for the Civilian Masters at Osborne and Dartmouth Colleges. The annual bonus, at the rate of £80 a year for each Master, is held in trust and accumulates at compound interest, the amount due being finally paid over on retirement or death.

Men.

Regulations have been issued revising the conditions of service and advancement of Petty Officers and men of the Seaman and Signal Branches as foreshadowed in last year's Statement. The objects aimed at, which were stated in the Circular Letter announcing the changes, are principally

(*a*) to ensure a higher standard of general efficiency in the higher Substantive Seaman and Signal Ratings, and to improve their position in relation to their subordinates, and

(*b*) to give effect to the broad principle that, as a rule, a man must show his fitness for responsibility and command before he is advanced to a higher Substantive rating.

The practical working of the new Scheme has shown that some modifications in the rules are required in respect of their effect on certain individual ratings, and a further notice will shortly be issued announcing some relief to men whom the first rules might be considered to affect injuriously.

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Under the new regulations Seaman and Stoker ratings are required to pass an educational test before advancement to Petty Officer rating. Those who pass are granted an educational certificate, which becomes the property of the holder, and will, it is hoped, be of assistance to a man to obtain employment after leaving the Service.

Opportunity has been given to a certain number of Signal ratings qualified in Wireless Telegraphy to turn over to the new Telegraphist Branch, and a limited number of Volunteers from Seamen and Marines have also been accepted. The nucleus of the new Branch has thus been formed, but in future it will be recruited from boys entered in the ordinary way in the Training Establishments, who will be put through a special course of Wireless Telegraphy before being drafted to sea. Arrangements have been made with the General Post Office for a limited number of Telegraph Messenger Boys to be entered in the Training Ships with a view to their becoming Wireless Operators if they succeed in qualifying.

The courses in Gunnery, Torpedo, and Field Training for ratings ashore and afloat have been revised and rearranged to meet modern requirements.

Regulations have been issued revising the conditions of service of Officers' Servants, who will in future be known by the titles of Officers' "Stewards and Cooks" instead of "Domestics." Their position has been improved, and those who hold a Good Conduct Medal on being pensioned will in future be eligible for a Good Conduct Gratuity.

Improvements have been made in the pay and position of Cook ratings in the Fleet with a view to attracting a better class of candidates for this Branch. The pay has been raised and all new entries are now allowed a free kit. The Cookery arrangements of the Fleet have also been entirely revised as the result of the report of a Committee appointed to enquire into the question. The old system of allowing men to act as Cooks of their Messes will be abolished, and in future an adequate staff of Cook ratings will be allowed in every ship, who will prepare and cook all the food for the Ship's Company.

The increase in the nucleus complements of vessels in the Home Fleet announced last year has been accompanied by a policy of drafting supernumerary ratings to those vessels instead of keeping them in barracks. As a result, the available accommodation in the Naval Barracks has been increased considerably, and advantage has been taken of this to arrange for the transfer of the Gunnery Schools at Devonport and Sheerness to the Naval Barracks and their

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amalgamation with the General Depôts at Devonport and Chatham. H.M.S. Cambridge, the former Gunnery School Ship at Devonport, was paid off last November and the establishment transferred to the Royal Naval Barracks, and the Gunnery School at Sheerness will shortly be treated in the same way. The Gunnery training at those two ports will in future be carried out under the Commodores of the Naval Barracks by Captains especially appointed for the purpose.

The scheme of training of Boy Artificers and Mechanicians is proceeding on the lines laid down. The staff of Engine Room Artificer Instructors has been rearranged to provide continuity of instruction. The first batch of Boy Artificers who passed out in January, 1907, were drafted to the Mediterranean Fleet, the second batch in April to the Channel and Atlantic Fleets, and the third batch in July to the Home Fleet and First Cruiser Squadron.

In view of the extension of turbine machinery, arrangements have been made for the instruction of officers and men on board the Fisgard, and a detailed syllabus of instruction and lectures has been drawn up.

There has been no difficulty in recruiting an adequate number of suitable candidates of all ratings required during the year. The various recruiting agencies entered 8326 in the various branches.

Forty Australian and New Zealand ratings of different Branches who had been entered in the Navy under the conditions of the Australasian Naval Agreement of 1903 were sent home to England in the spring to be trained for higher ratings in the training establishments at Portsmouth and subsequently in Battle Fleets. Very favourable reports on their efficiency have been received from the Commander-in-Chief at Portsmouth and the Commander-in-Chief of the Channel Fleet. A second contingent is now being sent to England.

Arrangements have been made with the General Post Office that a proportion of the vacancies occurring for postmen and other grades in the employ of the Postal Authorities in certain districts shall be reserved for men who have served in the Royal Navy or Royal Marines, and registers of applicants for such posts will be kept by Recruiting and Coast Guard Officers within those districts. It is hoped that by this means an extended area of employment will be afforded to pensioners and others.

Royal Marines.

The number of Royal Marines borne on March 31st, 1908, is estimated at about 17,400.

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There will also be about 1,200 Royal Marines for Naval Bands. Thirty-nine Bands from the Royal Naval School of Music have been embarked on board His Majesty's Ships.

Improvements in the Marine Barracks at Chatham are in progress. The alterations to the Sergeants' Mess have already been completed, adding considerably to the comfort of its members.

New sheds for Loading Gunnery Teachers have been erected at the Chatham and Portsmouth Divisions.

The transfer of the Royal Naval Reserve Battery at Devil's Point to the Plymouth Division, R.M., has been effected, and the building is being utilised as a gymnasium. This will doubtless prove an advantage to the Division.

Royal Fleet Reserve.

The numbers of the Royal Fleet Reserve have increased from a total of 16,222 to 17,964 during the year, the total strength on December 31st being:—

——	Class A.	Class B.	Total.
Seamen, &c.	3,484	6,346	9,830
Stokers	1,189	2,115	3,304
Marines	1,784	3,046	4,830
	6,457	11,507	17,964

Coast Guard.

The wastage of men during the current year has been slightly larger than usual, and the total reduction for the year is estimated at about 270. The total numbers borne on October 1st, 1907 (*i.e.*, the average for 1907–8), was 3772; the average total number for 1908–9 is estimated at about 3540.

All shore Naval Wireless Telegraphy stations are now under the control of the Admiral Commanding the Coast Guard and Reserves. The number of Naval Wireless Telegraphy and war signal stations existing on April 1st, 1908, and proposed to be erected during the ensuing year, will be:—

——	Existing on April 1st, 1908.	To be erected during 1908–9.
Wireless Telegraphy stations	11	3
War Signal stations	150	3

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Royal Naval Reserve.

The new scheme for the training of executive officers and seaman and stoker ratings of the Royal Naval Reserve is making satisfactory progress.

The strength of the Royal Naval Reserve (Home) on January 1st, 1908, was as follows:—

		Total.
Executive Officers	1,482	
Commissioned Engineer Officers	281	1,846
Warrant Engineers	83	
Engine Room Artificers	581	
Seaman Ratings	16,747	23,309
Stoker Ratings	5,981	

471 executive officers have undergone twelve months' training in the Fleet and are in receipt of training fees; 55 more are now undergoing this training.

There is a reduction of nearly 3000 in seaman ratings due to the older men (in the 4th, 5th, and 6th periods of enrolment) and seamen and second-class seamen who fail to qualify for the rating of seaman under the new conditions being discharged on completion of their current period of enrolment. This will continue until March 31st, 1911, when no man will be serving in a period later than the 4th, and the wastage will probably be from 8 to 10 per cent. per annum.

The following numbers have performed drill or training during the twelve months ended December 31st, 1907:—

	New System.		Old System.
	Three Months' Training afloat.	Annual or Biennial Training.	Drill (Nos. who have completed Annual Drill).
Executive Officers	—	100	631
Seamen ratings	495	786	12,728
Stoker ratings	95	467	3,903

The training under the new system continues to be carried out on board ships of the Home Fleet, and the reports on the Royal Naval Reserve men under training made by the Commanding Officers of these ships are generally satisfactory. There is no doubt that the training under the new system is very valuable, and will render the Royal Naval Reserve force a more efficient portion of the Naval *personnel*. The fact that there is always a certain proportion of

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Royal Naval Reserve officers and men actually serving in the "nucleus crew" ships at the three home ports is an additional advantage arising from the new system, as these officers and men are useful to the ships and are immediately available for mobilisation.

Recruiting for Engine Room Artificers, Royal Naval Reserve, which had been suspended since December, 1904, has been re-opened. There appears to be no lack of suitable candidates, and the 60 required were obtained within six weeks.

In order to stimulate an interest in signalling, and to encourage officers who have exhibited zeal for the subject, a short course of signals (lasting 14 days) was instituted this year for Royal Naval Reserve officers. The signal courses will take place each year at the Signal School at Portsmouth, the number of officers for each course being limited to ten. Twelve Lieutenants and two Sub-Lieutenants, Royal Naval Reserve, have taken advantage of this course during 1907, and the Superintendent of the Signal Schools rendered most satisfactory reports at the conclusion of the courses on the zeal and ability displayed by these officers. Instructions have also been issued for the training of officers in signals when employed afloat.

The instruction of Royal Naval Reserve seamen, under the new system, in signals is also receiving attention, and arrangements have been made for special attention to be given to seamen showing an aptitude in signals.

A modification in the qualifications required of Midshipmen, Royal Naval Reserve, for advancement to the rank of Acting Sub-Lieutenant, Royal Naval Reserve, has been made, as it was found that the period of service previously required resulted in officers of the rank of Midshipman attaining a position in the Mercantile Marine with which the rank of Midshipman was not commensurate.

Royal Naval Volunteer Reserve.

The strength of the Force remains at six Divisions, comprising 42 Companies, with total numbers as follows:—

Royal Naval Volunteers.	Establishment.	Borne Dec. 31st, 1907.	
Officers	186	151	8,302
Honorary officers	—	17	
Petty officers and men	4,122	3,134	
Permanent Staff—			
Officers	7	7	71
Petty officers and men	64	64	

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It will be observed that the present numbers are considerably below the authorised complement. This is probably due only to temporary causes which are being removed.

During the current financial year the following numbers have embarked for training afloat in ships of the Channel and Home (Nore Division and 5th Cruiser Squadron) Fleets for a short cruise of 14–28 days :—

Officers	86
Petty officers and men . . .	834

The training afloat of officers and men of the R.N.V.R. was carried out this year in fully-manned ships instead of, as in previous years, in nucleus crew ships, and the change has been beneficial, as the members of the R.N.V.R. are thus enabled to spend a large portion of their period of embarkation actually at sea, and to gain intimate acquaintance with the routine and work of a modern man-of-war. This system was much appreciated by the officers and men of the R.N.V.R., and will be continued in future.

Arrangements were made, as in the previous year, for men who are employed at a trade in civil life to qualify, during their training afloat, for a certificate in an equivalent Naval rating. Men who are in such employment and qualify for these certificates will form a valuable adjunct to the Fleet, if required in an emergency.

Officers and men have undergone courses at the various Schools in Gunnery, Torpedo and Signalling during the year, and the following have passed and obtained certificates :—

Officers	31
Petty officers and men . . .	61

Thirteen Medical Officers have undergone a 14 days' course of instruction at Haslar Hospital.

The reports on officers and men embarked or under instruction in the Schools have been most satisfactory, and testify to the zeal of the members of the R.N.V.R. and their anxiety to learn.

Much attention is being paid to the signalling instruction of the R.N.V.R. when on shore; Coast Guard Signal ratings have been detailed as instructors to the various Divisions and outlying Companies, and the efficiency of the Volunteers in this subject is making good progress.

The supply of heavy ordnance to the various Divisions was re-considered during the present year, and the Headquarters Companies are now allowed one 6-in. Q.F. gun in lieu of a 6-in. Q.F.C. gun. A 4·7-in. gun has been added to the Establishment of Outlying Companies.

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Approval has also been given to the grant of an allowance of £20 to officers in aid of their outfit, on such officers obtaining the necessary certificates of efficiency in gunnery, &c.

The Calliope has recently been lent to the Tyneside Division, Royal Naval Volunteer Reserve, for drill purposes, and as the Headquarters of that Division.

Greenwich Hospital.

Northern Estates.

The season has, on the whole, been favourable, and it is anticipated that the revenue from all sources will be maintained.

All the farms are let. A change of tenancy will take place in May next on one of the largest farms at Scremerston. An offer of an increased rental of £100 has been secured. Additional cottage accommodation is being provided at Scremerston for the employees of the Colliery Company on terms which have been arranged.

Greenwich Estate.

The improved conditions under which the Market is now held and the provision of stabling accommodation (a long-felt want) are gradually attracting fresh trade to the Market. The revenue continues to show a steady increase, and all the warehouses are let. The rebuilding of the property acquired in Church Street has been completed, and the new shops are letting at higher rentals than originally anticipated.

The system inaugurated last year of lending to the Market, with the guarantee of the Bank of England, available balances on the Greenwich Hospital Capital and Income Accounts has been continued with very satisfactory results. The total amount of interest received from this source this year is over £1300.

Painted Hall.

It is expected that the work on the restoration of the dome will be completed this financial year, but owing to unavoidable delay in deciding on the most suitable methods of strengthening the roof over the Hall without endangering the painted ceiling, it has been found necessary to defer this portion of the work until 1908.

Loans.

An increased rate of interest has been obtained on all new loans and renewals of old loans.

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Ordnance.

Guns.

The system of examining and proving heavy guns at contractors' works which was inaugurated in 1906 is being continued with satisfactory results.

Cordite.

It has been found that the temperature of the magazines of ships tends to reduce the life of the cordite stored in them. It has therefore been decided to cool artificially the cordite magazines on board ship. The regulations for the periodical testing of cordite have been made more stringent, and, in future, under the improved storage conditions, the safe age limit for cordite should be considerably increased. This increased inspection will enable cordite to be more closely watched, and any that is approaching its age limit will, so far as possible, be issued for practice purposes to the Fleet. Considerable saving will, it is hoped, thus be effected.

Hydraulic Mountings.

Experiments have been continued with satisfactory results to improve the ease of manipulation of heavy power worked mountings. The trials of the hydraulic gun mountings of the latest ships have been successful, and the newest designs embody further improvements which, it is hoped, will give greater rapidity and accuracy of fire.

The older types of 12-inch mountings in those battleships which may reasonably be expected to remain efficient fighting units during the next decade are being brought up to date so far as the original design will admit, so as to approximate to the later types in the principles of sighting and manipulation.

Other Mountings.

A heavier and more powerful type of anti-torpedo boat gun and mounting has been introduced as the standard gun for this service in the battleships and armoured cruisers now under construction.

Field Mountings.

Heavier and more powerful field guns and carriages with improved sighting arrangements are now under construction for the Fleet.

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Sights.

Arrangements have been made to bring the sighting arrangements of all ships up to date.

Fire Control.

The fitting of Fire Control instruments in existing ships has been proceeded, with and will be practically completed this year. The supply of improved Range Finders to the Fleet has been continued, and will be further extended next year.

Instructional Armaments.

The sloops Vestal and Rinaldo have been appropriated as firing tenders to H.M.S. Excellent and the Devonport Gunnery School, and will commence their duties early in 1908.

The supply of instructional shooting and loading appliances has been practically completed. Further improvements have been introduced in the apparatus for new ships.

Target Practice.

Revised rules for the Gunlayers' Tests and Battle Practice were issued to the Fleet early last year and the results have proved satisfactory. The Gunlayers' Tests for the coming year will be on the same general lines. The regulations for Battle Practice will be revised so as still further to assimilate this exercise to the conditions which would obtain in action.

A considerable increase in the annual allowance of ammunition for practice was approved for the ships of the Home Fleet last year. The results obtained have been very satisfactory.

The returns of the Gunlayers' Test show an increase in accuracy of 8 per cent. over that of the previous year. It should be borne in mind that these results are not the performances of a few picked men, but the average performance of the whole of the gunlayers of the Fleet. This practice is of particular value, since it affords a practical test and a yearly examination of the quickness, accuracy, and nerve of each individual firing number.

The light quick-firing test also shows a corresponding advance.

The result of the Battle Practice shows generally satisfactory improvement. To ensure uniformity and accuracy in the marking of the firing, two committees of umpires, each consisting of a Captain, a Commander, and three Gunnery Lieutenants, were appointed this year to assist the Inspector of Target Practice, and attended the

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firings of the Home, Channel, Atlantic, and Mediterranean Fleets. This was found to be of considerable advantage, and similar committees will be appointed next year. The Eastern Fleet could not be included in this arrangement, but next year a somewhat modified system will be employed for the China, East Indies, and Australian Squadrons.

Diving.

The Diving Committee formed last year have completed their investigations of the difficulties attending diving in deep water, and much practical information has been obtained.

Torpedoes.

Satisfactory advance has been made in developing the speed and range of torpedoes; experiments are still in progress.

Wireless Telegraphy.

Considerable progress has been made both in the apparatus and in the provision and training of operators. Instruments of an improved design will very shortly be fitted in a large number of ships. The strategical exercises carried out during the year have shown that a considerable advance has been made in the reliability and utility of this system of communication.

Inspection and Proof.

Next financial year the Admiralty will take over the Contract details in connection with the supply of Naval Ordnance and Ordnance Stores, as well as the major part of the Inspection work involved. A Chief Inspector of Naval Ordnance has been appointed, and in future the majority of the work of Inspection of Naval Ordnance stores will be done by Naval Officers under direct control of the Admiralty.

Ordnance Depôts.

Plymouth.—At the Magazine Depôt, Bull Point, an electric light installation has been completed, and the Depôt is now in a position to carry out work at night when required.

Portsmouth.—The Magazine Depôt, Priddy's Hard, is also being provided with electric light. At this Depôt two extra magazines have been completed, which will enable the explosives located at this place to be better and more safely distributed.

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Chatham.—The laboratories at Upnor and Lodge Hill for cartridges and shell have been completed and are being brought into use. The provision of these facilities for making up cartridges and filling shells has placed the Chatham District in a similar position to Portsmouth and Plymouth, all three districts being now self-contained in this respect.

The Depôt at Upnor is to be lighted by electricity, the current being supplied from Chatham Dockyard. A separate electrical installation for Lodge Hill is under consideration.

The separation of the Army and Naval Ordnance Services at Gibraltar was effected on October 1st, 1907, on which date the Naval Ordnance duties were placed under the Admiral Superintendent, with a Naval Ordnance officer in immediate charge.

During the year a beginning has been made in the direction of bringing the labour staff of the Naval Ordnance Depôts more closely into line with that of the Dockyards and other Naval Establishments. The subordinate officials have been placed on the established list with Dockyard scales of salary, and steps are now being taken to introduce scales of pay, &c., for the storehouse staff similar to those existing in other Admiralty Store Departments.

In the case of Woolwich the scales of pay and terms of service of the labour staff employed in the Naval Ordnance Depôt have been assimilated to those of the Army Ordnance Department at Woolwich.

Fuel of the Fleet.

Arrangements have been made to provide a number of sets of apparatus for coaling H.M. ships at sea.

A vessel has been purchased for the conveyance and supply of petroleum spirit in bulk to submarines.

Steps have been taken to commence the provision of stocks of oil fuel at ports around the coast to meet the wants of oil-burning ships.

Progress has been made in the installation of improved mechanical appliances for the more rapid handling of coal.

New Construction.

Battleships.

The Lord Nelson and Agamemnon are approaching completion, and will shortly be commissioned for service in the Home Fleet.

The three improved Dreadnoughts, the Bellerophon, Temeraire, and Superb, have been launched, and have made satisfactory progress.

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Alterations have been carried out in the Dreadnought as a result of the experience gained during the experimental cruises, and the improvements suggested have been embodied, where applicable, in the new ships of the class.

The designs of the new battleships for this financial year have been completed, and full advantage has been taken of the experience gained in the Dreadnought, and of the reports received from her officers.

All necessary preliminary work in connection with building the St. Vincent at Portsmouth and the Collingwood at Devonport has been carried out, and the vessels have been laid down in December and February respectively. The third battleship, to be named the Vanguard, which is to be built by contract, is about to be laid down at Barrow.

Armoured Cruisers.

The three great cruisers of the Invincible class are approaching completion and should be ready for commissioning early in the next financial year.

The Warrior has been completed and has joined the Home Fleet, so that all four vessels of her class are now in commission.

Of the latter class of cruisers, the Minotaur and Shannon have successfully passed through their trials and will be completed for sea about the end of this financial year. The third ship of this class, the Defence, has been launched at Pembroke, and is being prepared for her trials.

Unarmoured Cruiser.

The keel of the Boadicea was laid at Pembroke on July 1st, 1907, and it is hoped to launch her in April, 1908.

Destroyers and Torpedo Boats.

Of the 12 First Class torpedo boats—formerly classed as "coastal destroyers"—which were ordered during the financial year 1906–7, some have begun steam trials, and the rest will shortly be ready for them; it is expected that four will be delivered during the current financial year. Orders have been placed for the 12 boats of the same type provided for in the programme for 1907–8. They are repetitions of those previously ordered as regards general features, but embody improvements in details which experience showed to be desirable.

Of the five 33-knot torpedo boat destroyers ordered during 1905–6 four have obtained the contract speed, and the fifth will soon undergo her official trials. These vessels are of an entirely new type, and

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their novel character has involved much careful attention in working out details. The time expended in this direction has resulted in the contract speed being exceeded in three vessels by from ¾ to 2¼ knots. The two similar vessels ordered in 1906–7 will now be advanced as rapidly as possible by their builders in view of the actual experience obtained with the previous vessels.

Other Vessels.

His Majesty's Yacht Alexandra has been launched and well advanced towards completion, and it is anticipated that the vessel will be delivered by the end of the financial year.

The following Harbour Service vessels have been completed during the financial year:—

Three 500-ton oil fuel barges;

Mooring lighter for Sheerness;

Recovery, steam mooring lighter and tug for Devonport, and Robust, large tug for Sheerness;

Block lifting barge for Portsmouth; and

Six 20-ton ammunition barges.

The Cyclops, purchased for service as a Fleet repair ship, has been delivered during the year.

The Isla, a petrol carrying vessel, purchased and modified for the purpose, should be completed early next financial year.

The Blenheim has been converted into a seagoing parent ship for destroyers, and the Blake is now in hand at Chatham for a similar purpose. It is arranged to convert the St. George similarly during the year.

The Aquarius, a distilling vessel, has also been fitted as a repair ship for destroyers; the Tyne and Hecla are being fitted, the former as a depôt ship and the latter as depôt and repair ship for destroyers. The Vulcan repair ship is being re-boilered with water-tube boilers removed from the Medusa. The Cyclops, in addition to being fitted as a repair ship, is capable of acting as a distilling ship to the Fleet, and distilling apparatus of large capacity has been fitted to the Blake and the Blenheim for a similar purpose. All the repair ships are amply fitted with workshop machines, and are capable of executing repairs of considerable extent to the vessels which they are intended to aid.

The progress in the construction of submarine boats has been very satisfactory. The Bonaventure has been fitted as an armed parent ship for submarines, and the Vulcan will be completed similarly in 1908–9.

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Machinery and Boilers.

The Agamemnon and Shannon have been fitted with large tube boilers of the Yarrow type, and the Minotaur with boilers of the Babcock and Wilcox type. Small tube boilers, designed to burn oil fuel only, have been fitted in the torpedo boats and topedo boat destroyers

Three effective old First Class torpedo boats have been re-boilered with boilers of water-tube type in lieu of those of locomotive type with which they were originally fitted. Water-tube boilers for the remainder of these boats, in which this substitution has not been carried out, have been completed and will be installed during the remainder of this financial year or during 1908-9.

The capacity of the electric generating machinery in ships of the King Edward VII. and other recent classes is being increased by the provision of additional machines in order to cope with the more extended application of electrical power in these vessels.

The question of the suitability of automatic stoking apparatus for boilers using coal in H.M. Service afloat has been given consideration, and a trial is now proceeding in a gunboat.

Turbine Propelling Machinery.

All war vessels at present under construction are being fitted with machinery of this type, which has, without exception, proved very successful in the vessels which have been so fitted up to the present time. The type of marine turbine propelling machinery hitherto fitted or now being fitted in H.M. Ships is that known as the Parsons type. The development of other types of marine propelling turbines is being closely watched in view of their adoption in some foreign Navies.

Liquid Fuel.

During the year oil-burning appliances, as auxiliary to coal, have been completed and tried in the armoured cruisers Cochrane, Achilles, Natal, and Warrior, with satisfactory results. The first group of 12 torpedo boats fitted to burn oil only still continue to give satisfactory results on service.

All armoured vessels now under construction are being provided with arrangements for burning oil in conjunction with coal, and all torpedo craft for burning oil only. The four new destroyers of the Mohawk class, which have carried out their full-speed trials, used oil fuel only, and their installations haved proved satisfactory.

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Installations in the Majestic, Cæsar, Magnificent, and Victorious to burn oil and coal together are being completed.

Experimental and instructional work in the burning of oil fuel has been continued at Haslar and in the Fisgard IV. with various types of boilers and also in the destroyers Spiteful and Surly.

Special arrangements have been made in the instructional classes at Portsmouth and in the Fleet with the object of increasing the rate of instruction in this subject, and are proving satisfactory.

Work at the Dockyards.

The two submarine boats C 17 and C 18, which were laid down at Chatham in March, 1907, are now well in hand, and will probably be completed in August and November, 1908, respectively. These are the first vessels of the class constructed in H.M. Dockyards, and as a result of the experience thus gained it is hoped that the second pair of similar boats, shortly to be laid down at the same yard, will be completed by March, 1909.

The important and extensive scheme for installing electric light and power in H.M. Dockyards and Naval Establishments at home and abroad is approaching completion, the central generating stations, at several of the yards, being in full operation. There is no doubt that this employment of modern methods of lighting and driving has conferred immediate advantages as regards control and output of work, while ultimate economy will, it is confidently expected, also ensue.

The permanent adoption in the Home Dockyards of the uniform 48 hours working week, which the electrical system of lighting rendered possible, has given general satisfaction, and, by enabling hourly rates of pay to be established, has simplified and facilitated accounting transactions.

In consequence of the approval given to fit cooling arrangements to the cordite magazines in all H.M. Ships, a large amount of additional and unexpected work has been thrown upon the dockyards at home and abroad. To meet this special service, and at the same time to satisfy the general requirements of the Fleet in respect of running repairs, alterations, additions, and casualties, it has been necessary temporarily to increase the working staffs at several of the yards.

LARGE REPAIRS.

The following list shows the important vessels that have been, or are expected to be dealt with, wholly or partly, in the current and ensuing financial years:—

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Battleships.—1907–8 : Glory, Goliath, Canopus, Cæsar, Dominion, Commonwealth. 1908–9 : Formidable, Implacable, Prince George, London, Venerable.

Armoured Cruisers.—1907–8 : Sutlej, Cornwall, Cumberland, Leviathan, Drake, Suffolk. 1908–9 : Hogue, Berwick.

Protected Cruisers.—1907–8 : Terrible, Ariadne, Andromeda, Gibraltar, Spartiate, Fox, Edgar, Hawke. 1908–9 : Terrible, Niobe, Diadem, Gladiator, Forte, Doris, Pelorus, Medea.

Miscellaneous.—1907–8 : Vulcan,† Blenheim,* Blake,* Bonaventure,† Hecla,* Tyne,* Aquarius.‡ 1908–9 : Vulcan,† St. George,* Blake.*

New Works.

Works Provided in Estimates 1907–1908.

Cape of Good Hope—Simon's Bay Dockyard Extension.—The dock, east breakwater, east and west piers, and necessary dredging are well advanced. The main dam will be removed shortly. The erection of the shops for the constructive and engineering departments is begun.

Chatham.—The construction of the side walls of Upnor Entrance has made considerable progress, and it is anticipated that work will be completed in the early part of the ensuing financial year. The pumping culvert from River Medway to the basins, the extension of No. 2 dock and the additional accommodation for Boy Artificers will be completed this year. The boundary wall at Chattenden Magazine has been finished.

Dover—Harbour Works.—The Admiralty Pier extension, the reclamation, and the eastern arm are completed, with the exception of some minor works on the heads. The greater part of the south breakwater is completed, and arra...ents are being made for the erection of buildings on the head. The necessary dredging is being proceeded with.

Gibraltar.—The dredging work provided for is progressing.

The additional accommodation and improvements at the hospital and the extension of the jetty at Rosia Bay are practically completed.

Greenwich.—The work of renewing the roofs of the main blocks will shortly be completed.

Harwich (Shotley Point).—The work of providing additional hospital accommodation is in progress.

* Conversion into Depôt Ships for Destroyers.
† „ „ „ „ „ Submarines.
‡ Repair and distilling ship.

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Haulbowline.—A contract for the lengthening of the dock at this establishment has been let and the work is in hand.

Hong Kong.—A contract for the erection of the new storehouse has been let and work in connection with the foundations is being proceeded with. The necessary steel work is being shipped from England.

Steps are being taken for the execution of work in connection with the new electrical shop. Contracts have been let in England for steel work, and locally for erection.

The new torpedo range is practically finished.

Malta.—The work on the new reservoir is well advanced and will be completed next financial year.

The torpedo store and torpedo range will be completed this financial year.

Plymouth.—The work of renewing and strengthening girders and stanchions for the traveller in the factory, and of widening the drill shed at the Naval Barracks, is practically completed.

The new jetty and railways between No. 2 and 3 slips and the renewal of No. 4 dock gates will be finished next financial year.

Portland.—The repairs to the head of the breakwater, which have gradually been proceeded with for some years, have now been finished.

Portsmouth.—A contract will shortly be let for the main portion of the new Lock scheme. The new steam factory, improvements to shipbuilding facilities, lengthening of No. 15 dock, extension of mould loft floor, accommodation for Naval Cadets at Osborne, and enlarging offices at Whale Island are practically completed. The additional class-rooms and libraries at Dartmouth College will be completed shortly. The storehouse for inflammables and the harbour protection works are in progress.

A contract has been let for the erection of the new infectious hospital at Osborne.

Sheerness.—The dredging has been finished, and the work in connection with the harbour protection is approaching completion.

Coaling Facilities and Fuel Storage.—The coaling schemes at Portland, Gibraltar and Malta have been completed. The coaling jetty at Kowloon has been finished, and the coal sheds are in hand.

Plymouth.—The work in connection with the approved scheme for the establishment of a coaling depôt is progressing satisfactorily.

Oil Fuel Schemes.—In connection with the storage of oil fuel at Portland a concrete jetty and four tanks have been completed and foundations for two additional tanks are in hand. At Portsmouth a tender has been let for four tanks and preliminary works are in

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hand. At Plymouth a tender has been let for foundations, &c., and work on this portion is in hand.

Schemes for the storage of oil fuel at Haulbowline, the Medway, Malta, and Gibraltar are under consideration, and provision is made in 1908–9 for starting or continuing the work.

Accommodation on Shore for Boys' Training Establishments.

The training establishment at Shotley Point, Harwich, is approaching completion, and will be entirely finished early in the next financial year. It has been occupied for some time.

Accommodation and Storage of Submarines.

The work at Portsmouth has been finished and that at Dover has been commenced.

The principal new works provided for in 1908–9 are:—

Chatham.—Extension of No. 4 Dock. Royal Naval Barracks gymnasium.

Coast Signal Stations, &c.—Cleethorpes, Aberdeen, Pembroke, Rosyth, Culver Cliff, Horsea Island, and south-eastern District.

Gibraltar.—Ship caisson. Police quarters. Railway, &c., for the transport of sick between the new mole and hospital.

Hong Kong.—Work shed on west side of new dock. Reclamation of ground at Kowloon coaling depôt.

Plymouth.—New caisson between Nos. 2 and 3 Basins, North Yard.

Portland.—Rebuilding the outer part of boat camber. Officers' recreation ground.

Portsmouth.—Additional "Fleet" latrines. New pay room. New joiners' shop. Repairs to old joiners' shop. Bedenham—new magazines. Royal Naval Barracks—gymnasium and swimming bath. Haslar Hospital—reconstructing flats. New lunatic ward.

Rosyth.—New dock, lock, and basin and new magazine.

Shoeburyness.—Increased facilities for proof of cordite. New pier.

PROGRESS UNDER NAVAL WORKS ACTS.

(*a*) *Enclosure and Defence of Harbours.*

Malta Breakwater.—The minor works connected with the scheme, including wharf walls and diversion of sewage, have been completed.

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Better progress is now being made with the main contract work, viz., the St. Elmo and Ricasoli breakwaters, the latter, *i.e.*, the short arm, being finished.

(*b*) *Adapting Naval Ports to the present Needs of the Fleet.*

Deepening Harbours and Approaches.—The whole of the work provided for in this item has been finished. Provision is made in Vote 10, 1908–9, for working Admiralty plant engaged upon special dredging at the various ports to which the plant is attached.

Gibraltar Dockyard Extension.—The residences for the officers and artisans will be completed in 1908–9.

Hong Kong Dockyard Extension.—The tidal basin and wharf walls, the deepening of basin areas, approaches to wharf walls, &c., the buildings for the engineering and constructive departments and the graving dock, &c., are not yet quite completed, but it is anticipated that the whole of the dockyard extension work will be finished in the ensuing financial year.

Colombo Dock.—Arrangements are being made for the erection of shops, &c., and for certain incidental work. The North Guide pier is being proceeded with.

Malta Dockyard Extension.—The two new docks are completed, as well as most of the buildings. The remainder will be completed next financial year.

(c) *Naval Barracks, &c.*

Gunnery Schools, Chatham.—The scheme of new buildings, &c., will be completed this financial year.

Devonport.—The instructional buildings and men's quarters are completed.

Magazines, Chatham.—The two additional magazines at Chattenden are completed.

The two additional cordite magazines at Priddy's Hard, the additional shell stores at Bull Point and the additional magazine accommodation at Malta will be completed this financial year.

Torpedo Ranges.—Arrangements are being made for the provision of a range, workshops, &c., in Scotland.

Electric Light and Power in Naval Establishments.

The generating stations at the various Establishments have all been completed, and it is anticipated that all work in connection with the installation will be finished during 1908–9.

T.

February 11th, 1908.

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STATEMENT showing the NET EXPENDITURE from NAVAL VOTES and LOANS on account of NAVAL SERVICES for the YEARS 1901-2 to 1906-7, together with the ESTIMATES for 1907-8 and 1908-9.

Year.	Total Expenditure from Naval Votes (Net). (1)	Annuity in Repayment of Loans under the Naval Works Acts. (2)	Total Expenditure exclusive of Annuity [Column (2) deducted from Column (1).] (3)	Expenditure from Loans under Naval Works Acts (4)	Total of Columns (3) and (4). (5)	Expenditure on New Construction (Vote 8). (6)
	£	£	£	£	£	£
1901-2	30,981,315	122,255	30,859,060	2,745,176	33,604,236	8,865,080
1902-3	31,003,977	297,895	30,706,082	3,198,017	33,904,099	8,534,917
1903-4	35,709,477	502,010	35,207,467	3,261,083	38,468,550	11,115,733
1904-5	36,859,681	634,238	36,225,443	3,402,575	39,628,018	11,263,019
1905-6	33,151,841	1,015,812	32,136,029	3,313,604	35,449,633	9,688,044
1906-7	31,472,087	1,094,309	30,377,778	2,431,201	32,808,979	8,861,897
1907-8 (estimated) . . .	31,419,500	1,214,402	30,205,098	1,135,000	31,340,098	8,100,000
1908-9 (estimated) . . .	32,319,500	1,264,032	31,055,468	896,925	31,952,393	7,545,202

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Abstract of Navy

Votes.		Estimates,	
		Gross Estimate.	Appropriations in Aid.
	I.—Numbers.		
A.	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	128,000	....
	II.—Effective Services.	£	£
1	Wages, &c., of Officers, Seamen and Boys, Coast Guard, and Royal Marines	7,266,217	136,517
2	Victualling and Clothing for the Navy . . .	2,862,071	575,671
3	Medical Establishments and Services . . .	278,962	20,262
4	Martial Law	14,000	100
5	Educational Services	230,441	63,441
6	Scientific Services	95,195	29,195
7	Royal Naval Reserves	376,584	8,284
8	Shipbuilding, Repairs, Maintenance, &c.:		
	Section I.—*Personnel*	2,958,000	21,800
	Section II.—*Matériel*	4,539,000	382,000
	Section III.—Contract Work	7,357,700	137,000
9	Naval Armaments	2,208,700	160,000
10	Works, Buildings, and Repairs at Home and Abroad .	2,340,700	34,000
11	Miscellaneous Effective Services	421,607	12,407
12	Admiralty Office	378,975	8,775
	Total Effective Services . . . £	31,328,152	1,589,452
	III.—Non-Effective Services.		
13	Half-Pay and Retired Pay	881,618	12,818
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,354,393	19,793
15	Civil Pensions and Gratuities	377,840	440
	Total Non-Effective Services . . £	2,613,851	33,051
	Grand Total . . . £	33,942,003	1,622,503

Note.—Provision to the extent of £390,661 is included in the Estimates for 1908–1909 under Votes 8, 10 and 12, for Works Acts, 1895 to 1905.

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Estimates for 1908-1909.

1908-1909.	Estimates, 1907-1908.			Difference on Net Estimates.		Votes.
Net Estimate.	Gross Estimate.	Appropriations in Aid.	Net Estimate.	Increase.	Decrease.	
Total Numbers. 128,000	128,000	....	Total Numbers. 128,000	Numbers.	Numbers.	A.
£	£	£	£	£	£	
7,129,700	7,006,412	136,712	6,869,700	260,000	....	1
2,286,400	2,441,217	444,817	1,996,400	290,000	....	2
258,700	287,856	19,156	268,700	....	10,000	3
13,900	14,295	95	14,200	....	300	4
167,000	236,831	64,331	172,500	....	5,500	5
66,000	90,280	25,180	65,100	900	....	6
368,300	426,518	8,218	418,300	....	50,000	7
						8
2,936,200	2,571,700	21,800	2,549,900	386,300	....	Sec. I.
4,157,000	3,420,200	385,000	3,035,200	1,121,800	....	Sec. II.
7,220,700	7,783,000	137,000	7,646,000	....	425,300	Sec. III.
2,048,700	2,508,700	160,000	2,348,700	....	300,000	9
2,306,700	2,792,400	34,000	2,758,400	....	451,700	10
409,200	414,437	13,437	401,000	8,200	....	11
370,200	373,350	8,750	364,600	5,600	....	12
29,738,700	30,367,196	1,458,496	28,908,700	2,072,800	1,242,800	
868,800	850,775	12,875	837,900	30,900	....	13
1,334,600	1,321,745	19,745	1,302,000	32,600	....	14
377,400	371,330	430	370,900	6,500	....	15
2,580,800	2,543,850	33,050	2,510,800	70,000	....	
32,319,500	32,911,046	1,491,546	31,419,500	2,142,800	1,242,800	
			Net Increase			£900,000

the continuation of services provided for prior to 1st April, 1907, out of funds raised under the authority of the Naval

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STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1907–1908 and those for 1908–1909.

INCREASES.		£
Wages, &c., of Officers, Seamen and Marines		260,000
Victualling and Clothing		290,000
Scientific Services		900
Wages of Artificers and Police in Dockyards		380,630
Naval Stores, and Fuel, &c., for the Fleet		1,107,200
Decrease in Amount of Receipts arising from the Sale of Unserviceable Naval Stores and Machinery		40,000
Auxiliary Machinery for His Majesty's Ships and Vessels (Contract)		84,215
Armour for His Majesty's Ships and Vessels (Contract)		263,215
Inspection of Contract Work		10,570
Machinery, &c., for His Majesty's Shore Establishments (Contract)		96,200
Royal Reserve of Merchant Cruisers		38,000
Purchase of Ships, Vessels, &c.		30,000
Small Arms, Maintenance of Naval Ordnance Vessels, and Miscellaneous Naval Ordnance Stores		74,800
Inspection, Proof, Experiments, &c., in connection with Naval Ordnance Stores		11,000
Wages of Artificers and Police in Naval Ordnance Establishments		9,492
Miscellaneous Effective Services		8,200
Non-Effective Services		70,000
Miscellaneous Increases		10,278
		£2,784,700
DECREASES.	£	
Medical Establishments and Services	10,000	
Educational Services	5,500	
Royal Naval Reserves	50,000	
Increase in Amount of Receipts arising from the Sale of Old Ships	27,000	
Propelling Machinery for His Majesty's Ships and Vessels (Contract)	235,094	
Hulls of Ships (Contract)	573,278	
Repairs and Alterations by Contract of Ships, &c.	18,000	
Gun Mountings and Air-Compressing Machinery (Contract)	121,128	
Guns	120,000	
Projectiles and Ammunition	175,000	
Torpedoes and Gun-cotton	98,000	
Works, Buildings, and Repairs	451,700	
		1,884,700
Net Increase		£ 900,000

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STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services :—

		1908–1909.	1907–1908.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid) . .		32,319,500	31,419,500
CIVIL SERVICE ESTIMATES: (a)			
Estimated Expenditure under—			
Class I. Vote 9.—Public Buildings, Great Britain:			
Maintenance and Repairs, including New Works, Alterations, &c. .	£ 35,380		
Rents, Insurance, Tithes, &c. . .	10,600		
Fuel, Light, Water, &c. . . .	5,400		
Furniture	4,500		
		55,880	45,630
Class I. Vote 10.—Surveys of the United Kingdom . . .		2,850	2,000
„ I. „ 13.—Rates on Government Property		135,400	128,700
„ I. „ 14.—Public Works and Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites . . .	—		
New Works and Alterations, including Naval Reserve Stations . .	3,315		
Maintenance and Supplies . .	4,107		
	£7,422		
Naval Reserve, viz.:			
Maintenance and Supplies . .	100		
		7,522	7,948
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . . .		4,000	4,150
„ II. „ 9.—Mercantile Marine Services:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . . .		3,000	3,300
„ II. „ 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts . . .	9,225		
Expense and Manufacturing Accounts	5,725		
Store Accounts	5,947		
		20,897	20,225
Class II. Vote 23.—Stationery and Printing		100,000	100,000
„ III. „ 1.—Law Charges, England		9,478	8,148
Maintenance of Naval Prisoners:			
„ III. „ 7.—Prisons, England and the Colonies . . .		3,456	4,252
„ III. „ 13.—Prisons, Scotland		120	150
„ III. „ 20.—Prisons, Ireland		379	397
REVENUE DEPARTMENT ESTIMATES:			
Vote 1.—Customs.—Percentage for provision of funds for District Paymasters of the Coast Guard		160	135
Vote 1.—Customs.—Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,300	3,300
Vote 2.—Inland Revenue.—Analysis of Food, &c.		300	275
Vote 3.—Post Office.—Postage of Official Correspondence (including Parcels)	£ 21,000		
Vote 5.—Post Office Telegraphs.—Official Telegrams and Expenses in connection with Telegraphs (Admiralty Wires, and Services of Clerks) . . .	15,000		
		36,000	41,750
Total	£	32,702,242	31,789,860

Note.—In addition to the Services shown above, an annuity of £16,243 18*s.* is payable to the Commissioners of Woods, &c., from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

(*a*) Provision is also made in the Estimate for Osborne (Class I., Vote 2) for expenditure in connection with the treatment of invalid Officers of the Navy in the Convalescent Home at Osborne.

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STATEMENT showing the CONTRIBUTIONS from INDIA and the COLONIES towards NAVAL EXPENDITURE.

RECEIVED FROM.	NATURE OF SERVICE.	VOTE. 1	2	3	7	8 Section I.	8 Section II.	8 Section III.	9	11	12	13	14	15	TOTAL.
		£	£	£	£	£	£	£	£	£	£	£	£	£	£
India	Maintenance of His Majesty's Ships in Indian Waters	28,000	9,100	500	..	12,500	10,200	13,000	11,600	2,500	..	4,300	8,300	..	100,000
	Indian Troop Service (on account of work performed by the Admiralty)	..	..	..	..	..	..	..	..	..	3,050	..	..	350	3,400
Australian Commonwealth	Maintenance of an Australasian Squadron and the establishment of a branch of the Royal Naval Reserve	58,000	18,300	600	5,000	..	30,700	95,000	5,500	7,000	..	8,500	11,400	..	200,000
Dominion of New Zealand															40,000
Cape Colony	General maintenance of the Navy	11,100	4,600	..	..	4,900	9,100	14,100	6,200	..	..	..	..	..	50,000
Natal		7,700	3,200	..	..	3,400	6,400	9,900	4,400	..	..	..	..	..	35,000
Newfoundland	Maintenance of a branch of the Royal Naval Reserve	..	..	..	3,000	..	..	..	..	..	..	..	..	..	3,000
	Total £	104,800	35,200	1,100	8,000	20,800	56,400	132,000	27,700	9,500	3,050	12,800	19,700	350	431,400

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VOTE (A).

NUMBERS of OFFICERS, SEAMEN, BOYS, COAST GUARD, and ROYAL MARINES Borne on the Books of His Majesty's Ships, and at the ROYAL MARINE DIVISIONS.

One Hundred and Twenty-eight Thousand.
(128,000.*)

I.—SEA SERVICE.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1908–1909.		1907–1908.		Numbers of all Ranks borne on 1st January, 1908.
Vote 1	FOR HIS MAJESTY'S FLEET:					
	Flag Officers	26		26		
	Commissioned Officers	4,618		4,580		
	Subordinate Officers	638		641		
	Warrant Officers	1,767		1,760		
	Petty Officers and Seamen	91,315		90,729		
	Boys (Service)	1,634	99,998	1,943	99,679	99,219
	COAST GUARD:					
	Commissioned Officers	103		109		
	Chief Officers Divisions and Stations	230		232		
	Petty Officers and Seamen	3,207	3,540	3,562	3,903	3,742
	ROYAL MARINES (for Service Afloat and on Shore):					
	Commissioned Officers	458		471		
	Warrant Officers	44		43		
	Staff Sergeants and Sergeants	1,370		1,385		
	Band Ranks, Buglers and Musicians	1,426		1,520		
	Rank and File	14,645		14,720		
	Band Boys	403	(a) 18,346	232	18,371	18,309
	Total		121,884		121,953	121,270
	Net Decrease				69	

* Average for the year. (a) Including 13 officers, Sub-Head H.

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VOTE (A)—*continued.*

II.—OTHER SERVICES.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1908-1909.		1907-1908.		Numbers of all Ranks borne on 1st January, 1908.
Vote 1	Naval Cadets	784		769		
	Engineer Cadets	55		109		
	Pensioners in Home Ships, &c.	416		471		
	Boys under Training—					
	Seaman Class	2,630		2,200		
	Artificer Class	533	(b)	539		
			4,418		4,088	4,166
Vote 2	For Victualling and Clothing for the Navy	3		22		
Vote 3	For Medical Establishments and Services	554		573		
Vote 4	For Martial Law	23		19		
Vote 5	For Educational Services	576		607		
Vote 6	For Scientific Services	10		12		
Vote 7	For Royal Naval Reserves	54		52		
Vote 8	For Shipbuilding, Repairs, Maintenance, &c.:					
	Section I.	241		362		
	Section II.	27		21		
	Section III.	74		71		
Vote 9	For Naval Armaments	67		105		
Vote 10	For Works, Buildings, and Repairs, at Home and Abroad	—		47		
Vote 11	For Miscellaneous Effective Services	1		1		
Vote 12	For Admiralty Office	68		67		
			1,698		1,959	1,902
	Total		(c) 6,116		6,047	6,068
	Net Increase		69			
	Total, Sea Service	121,884		121,953		
	„ other Services	6,116		6,047		
			128,000		128,000	

No Variation in Total.

(b) Including 12 officers, Sub-Head H.

(c) Including

Officers, Seamen and Service Boys	2,343	..	2,396
„ Retired Officers and Pensioners (Vote 1)	416	..	471
„ Boys (Training, Seaman Class)	2,630	..	2,200
„ Boys (Training, Artificer)	533	..	539
„ Boys (Training, Artisan)	77	..	217
„ Royal Marines	117	..	224
	6,116	..	6,047

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VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1909, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—Two Million Nine Hundred and Thirty-six Thousand Two Hundred Pounds.

(£2,936,200.)

SECTION II.—MATÉRIEL.—Four Million One Hundred and Fifty-seven Thousand Pounds.

(£4,157,000.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Seven Million Two Hundred and Twenty Thousand Seven Hundred Pounds.

(£7,220,700.)

(Total of the Three Sections of Vote 8 . . **£14,313,900.**)

II.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

	ESTIMATES. 1908-1909.	ESTIMATES. 1907-1908.	Increase.	Decrease.
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.	£	£	£	£
A.—Salaries and Allowances . . .	(*a*) 227,736	223,470	4,266	..
B.—Wages, &c., of Men, and hire of Teams	2,193,155	1,879,389	313,766	..
C.—Wages, &c., of Police Force . .	51,211	50,531	680	..
D.—Contingencies	2,400	2,400	..	..
Naval Yards Abroad.				
E.—Salaries and Allowances . . .	(*a*) 106,423	105,019	1,044	..
F.—Wages, &c., of Men, and hire of Teams	356,528	291,078	65,450	..
G.—Wages, &c., of Police Force . .	19,747	19,013	734	..
H.—Contingencies	800	800	..	..
	£ 2,958,000	2,571,700	386,300	.
Deduct,—				
I.—Appropriations in Aid . . .	21,800	21,800	..	..
	£ 2,936,200	2,549,900	386,300	..
		Net Increase .	£386,300 (*b*)	

(*a*) These amounts include the sums of £35,950 for pay of Inspectors of Trades and Senior Draughtsmen at Home and £14,560 for pay of Inspectors of Trades Abroad, which is charged direct to the cost of shipbuilding.

(*b*) This Vote is increased by a sum of £2,700 in respect of Dockyard Labour on Fixed Machinery provided for prior to 1st April, 1907, by advances under the Naval Works Acts, 1895 to 1905.

Note.—Provision has been made for New Construction in the above Vote to the extent of—

Section 1	£619,970
„ 2	547,420
„ 3	6,347,812
	£7,545,202

The difference (£2,305) between the provision under Section III. of the Vote (£6,347,812) and the amount shown in the Programme (£6,350,117) is due to the estimated withdrawals from Stock of transferable auxiliary machinery, gun mountings and steamboats during the year being slightly in excess of the cash payments for like articles brought into Stock in the same period.

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VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1908-1909.	1907-1908.		
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores, &c.	£	£	£	£
A.—Timber, Masts, Deals, &c. . .	152,000	147,000	5,000	..
B.—Metals and Metal Articles . .	920,500	505,000	415,500	..
C.—Coal for Yard purposes . .	158,000	73,000	85,000	..
D.—Hemp, Canvas, &c. . . .	136,000	98,000	38,000	..
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles .	552,000	289,000	263,000	..
F.—Electrical, Torpedo, and other Apparatus	439,000	365,300	73,700	..
G.—Freight	50,000	55,000	..	5,000
H.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad	37,600	38,400	..	800
I.—Gas, Electric Light, &c., Dockyards at Home and Naval Yards Abroad.	19,900	17,500	2,400	..
Deduct,— £	2,465,000	1,588,200	882,600	5,800
			Add,—	
J.—Appropriations in Aid. . .	352,000	365,000	13,000	..
£	2,113,000	1,223,200	895,600	5,800
Fuel, &c., for the Fleet.				
K. I.—Fuel, Lubricating Oils, &c., for the Fleet	1,822,000	1,480,000	342,000	..
K. II.—New Craft and Machinery for Coaling, &c.	67,000	80,000	..	13,000
K. III.—Salaries, Wages, and Allowances	122,000	128,000	..	6,000
K. IV.—Maintenance of Craft for Coaling, &c., and incidental expenses	63,000	71,500	..	8,500
K. V.—Lubricating Oils, &c., for the Fleet	..	72,500	..	72,500
Deduct,— £	2,074,000	1,832,000	342,000	100,000
L.—Appropriations in Aid . . .	30,000	20,000	10,000	..
£	2,044,000	1,812,000	332,000	100,000
£	4,157,000	3,035,200	1,227,600	105,800
	Net Increase .		£1,121,800 (a)	

(a) This Vote is increased by a sum of £3,975 under Naval Stores, and of £24,500 under Sub-Head K. II. in respect of Fixed Machinery provided for prior to 1st April, 1907, by advances under the Naval Works Acts, 1895 to 1905.

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VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1908–1909.	1907–1908.		
SECTION III.—CONTRACT WORK.	£	£	£	£
A.—Propelling Machinery for His Majesty's Ships and Vessels . .	2,264,408	2,499,502	..	235,094
B.—Auxiliary Machinery for His Majesty's Ships and Vessels . .	216,970	132,755	84,215	..
C.—Hulls of Ships, &c., Building by Contract	1,257,074	1,830,352	..	573,278
D.—Armour for His Majesty's Ships and Vessels	1,249,666	986,451	263,215	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	77,500	95,500	..	18,000
F.—Inspection of Contract Work . .	75,000	64,430	10,570	..
G.—Gun Mountings and Air-Compressing Machinery	1,737,082	1,858,210	..	121,128
H.—Machinery, &c., for His Majesty's Shore Establishments at Home and Abroad	250,000	130,000	120,000	..
H.H.—Fixed Machinery, formerly provided for by Advances under the Naval Works Acts, 1895 to 1905 .	50,000	73,800	..	23,800
I.—Royal Reserve of Merchant Cruisers.	150,000	112,000	38,000	..
K.—Purchase of Ships, Vessels, &c. .	30,000	..	30,000	..
£	7,357,700	7,783,000	546,000	971,300
Deduct,—				
L.—Appropriations in Aid . . .	137,000	137,000	..	..
£	7,220,700	7,646,000	546,000	971,300
	Net Decrease . .		£425,300 (a)	

(a) This Vote is increased by a sum of £50,000 (Sub-Head H.H.) in respect of Fixed Machinery provided or prior to 1st April, 1907, by advances under the Naval Works Acts, 1895 to 1905.

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PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET
REPAIRS, MAINTENANCE, &c.,
(Exclusive of the FLEET

SUB-HEADS under which this ESTIMATED EXPENDITURE will be
provisions of Section 1 (2), ARMY

ESTIMATED EXPENDITURE IN

	Direct Expenditure.				
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (a)	
	Personnel, Sec. I.	Matériel, Sec. II.			
NEW CONSTRUCTION:	£	£	£	£	
A.—DOCKYARD-BUILT SHIPS—					
Hulls, &c. (c)	570,440	488,730	(f) 1,619,083	2,678,253	1
Machinery	47,100	27,685	832,121	906,906	2
	617,540	516,415	2,451,204	3,585,159	3
B.—CONTRACT-BUILT SHIPS—					
Hulls, &c. (c)	13,010	21,505	(g) 2,422,447	2,456,962	4
Machinery	..	..	1,381,681	1,381,681	5
	13,010	21,505	3,804,128	3,838,643	6
C.—SMALL VESSELS (d) . .	19,420	9,500	94,785	123,705	7
TOTAL NEW CONSTRUCTION	649,970	547,420	6,350,117	(e) 7,547,507	8
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c. . . .	1,289,338	711,135	490,554	2,494,027	9
E.—SEA STORES, &c. . . .	..	877,700	36,438	914,138	10
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED .	..	..	..	..	11
TOTAL . . £	1,939,308	2,139,255	6,877,109	10,955,672	12

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(d) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under other Sub-Heads.
(e) Exclusive of £9,800 provided under Vote 2 for new Lighters for Victualling Yard Service, £2,000 provided under Vote 9 for new Vessels for Naval Ordnance Store Service, £8,000 provided under Vote 10 for new Craft for Works epartment, and £37,000 for Coaling Craft, Vote 8, Section 2, Sub-Head K.
(f) Including £809,576 for Armour. (g) Including £433,090 for Armour.

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VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION, in the Year 1908–1909.
COALING SERVICE.)
accounted for in the NAVY EXPENSE ACCOUNTS, under the AND NAVY AUDIT ACT, 1889.

	1908–1909.		EXPENDITURE AS ESTIMATED IN NAVY ESTIMATES, 1907–1908.			Difference between Direct Expenditure, 1907–1908 (B) and 1908–1909 (A).	
	Establishment, &c., Charges, apportioned.	Aggregate, 1908–1909.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1907–1908.	Increase.	Decrease.
	£	£	£	£	£	£	£
1	216,658	2,894,911	(h) 2,301,478	222,750	2,524,228	376,775	..
2	31,352	938,258	771,407	27,118	798,525	135,499	..
3	**248,010**	**3,833,169**	**3,072,885**	**249,868**	**3,322,753**	**512,274**	..
4	57,730	2,514,692	(i) 3,168,927	65,728	3,234,655	..	711,965
5	31,066	1,412,747	1,793,531	33,701	1,827,232	..	411,850
6	**88,796**	**3,927,439**	**4,962,458**	**99,429**	**5,061,887**	..	**1,123,815**
7	6,827	130,532	77,859	6,066	83,925	45,846	..
8	**343,633**	**7,891,140**	**8,113,202**	**355,363**	**8,468,565**	..	**565,695**
9	334,292	2,828,319	1,800,198	303,677	2,103,875	693,829	..
10	85,884	1,000,022	771,870	93,182	865,052	142,268	..
	763,809			752,222			
11	2,067,828	2,067,828	..	2,226,276	2,226,276	..	..
12	**2,831,637**	**13,787,309**	**10,685,270**	**2,978,498**	**13,663,768**	..	..
	NET INCREASE ON DIRECT EXPENDITURE . .					**£270,402**	

(h) Including £620,000 for Armour.
(i) Including £359,451 for Armour.

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RECAPITULATION OF ESTIMATED EXPENDITURE.

SUB-HEADS OF EXPENDITURE.	Total Direct Expenditure.	Establishment, etc., Charges Apportioned.	New Construction.	Re-construction, Repairs, etc.		Sea Stores, etc.	Establishment, Incidental, and Miscellaneous Charges Unappropriated.		Aggregate, 1908-9.
				Ships for Reliefs or Re-commission.	Ships in Commission and Reserve.				
DOCKYARD WORK—	£	£	£	£	£	£	£	£	£
Section I.—*Personnel* . .	1,939,308	1,217,302	772,215	448,323	1,034,567	54,912	539,460	307,133	3,156,610
Section II.—*Matériel* . .	2,139,255	1,001,885	629,934	252,643	594,056	908,672	493,952	502,253	3,141,140
CONTRACT WORK—									
Section III.	6,877,109	612,450	6,488,991	69,623	429,107	36,438	225,030	—	7,489,559
Total Estimated Expenditure for 1908-1909	10,955,672	2,831,637	7,891,140	770,589	2,057,730	1,000,022	1,258,442	809,386	13,787,309
Totals of Sub-Heads £	**13,787,309**		**7,891,140**	**2,828,319**		**1,000,022**	**2,067,828**		**13,787,309**

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DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS. DURING THE 33 YEARS BETWEEN 1870-71 & 1903-4.

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LIST of NEW SHIPS and VESSELS Estimated to be Passed into COMMISSION during the Years 1908–1909 and 1907–1908.

1908–1909.				1907–1908.			
NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.	NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS.				**ARMOURED SHIPS.**			
Bellerophon . . .	18,600	23,000	..	Lord Nelson . .	16,500	16,750	14
Temeraire . . .	18,600	*23,000	..	Minotaur . . .	14,600	27,000	14
Superb	18,600	23,000	..	Shannon	14,600	*27,000	14
Agamemnon . . .	16,500	*16,750	14	Warrior	13,550	*23,500	10
Invincible	17,250	*41,000	..				
Inflexible	17,250	*41,000	..				
Indomitable . . .	17,250	41,000	..				
Defence	14,600	*27,000	14				
UNARMOURED SHIP.				**UNARMOURED SHIPS.**			
Boadicea	3,300	*18,000	..	Cyclops	..	*3,544 (Howden's)	..
				Alexandra . . .	2,050	*4,500	..
TORPEDO CRAFT.				**TORPEDO CRAFT.**			
Swift	1,800 (estimated)	*30,000	4				
TORPEDO BOAT DESTROYERS . 3	..	Various	3 (each)	TORPEDO BOAT DESTROYERS . 4	..	Various	3 (each)
FIRST-CLASS TORPEDO BOATS . 19	..	Various	2 (each)	FIRST-CLASS TORPEDO BOATS . 11	..	Various	2 (each)
SUBMARINE BOATS 17	..	..	..	SUBMARINE BOATS 9	..	..	..

* Forced draught.

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Memorandum Showing Progress and Expenditure, &c., on Items included in the Naval Works Act.

Head (a).—ENCLOSURE AND DEFENCE OF HARBOURS.

Gibraltar Harbour.

Total Estimate in the Act 1905 is £1,199,000, since revised to £1,206,400.

The work has been practically completed.

Gibraltar Commercial Mole.

Total Estimate in the Act 1905, £669,000, since revised to £659,000.

The Mole has been completed at a cost of about £651,000, and is in use.

Portland Breakwater.

Total Estimate in the Act 1905, £650,000, since revised to £652,000. The item has been completed.

Dover Harbour.

Total Estimate in the Act 1905, £3,500,000.

The estimated expenditure up to March 31st, 1908, is about £3,208,500, of which about £147,000 is charged to Navy Votes in consequence of decision not to have any more Loan Acts.

The date for completion given in the 1905 Act is 1908–9, but it will probably not be finished until 1909–10.

The Admiralty Pier Extension, the Reclamation, and the Eastern Arm are completed, with the exception of some minor works on the heads. The greater part of the South Breakwater is completed, and arrangements are being made for the erection of buildings on the head.

Malta Breakwater.

Total Estimate in the Act 1905, £950,000. In consequence of the reduction of the Fleet in the Mediterranean, the scheme has been modified and its estimated cost revised to £625,000.

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The expenditure incurred to March 31st, 1908, is expected to be about £386,500, of which about £1900 is charged to Navy Vote 8.

The anticipated date of completion is 1909–10.

The main contract for the construction of Ricasoli and St. Elmo breakwaters was originally due for completion on August 1st, 1907.

The contract was, however, delayed by storms which did considerable damage to the temporary staging. An extension of time has therefore been allowed.

Head (b).—ADAPTING NAVAL PORTS TO PRESENT NEEDS OF FLEET.

Deepening Harbours and Approaches.

Total Estimate in the Act 1905, £1,360,000, revised to £1,346,000.

Of this sum about £1,342,800 is expected to be spent to March 31st, 1908.

When the Naval Works Act, 1905, was framed it was decided that after 1905–6 this work should be continued as a charge to Navy Vote 10, with the exception of the balances of contract dredging in hand amounting to about £17,000. There is expected to be a saving of about £3000 on the above revised total estimate.

Keyham Dockyard Extension.

Total Estimate in the Act 1905, £4,500,000.

The expenditure up to March 31st, 1908, will be about £4,211,000, of which about £23,600 is charged to Navy Vote 8.

The expected date of completion, as given in the 1905 Act, is 1908–9.

The works under the main contracts are completed, and the new Docks, Locks, and Basins are in use. Many of the buildings are in course of construction, and arrangements are being made for the erection of the remainder. It is anticipated that the entire work will not be completed until 1909–10.

Portsmouth Docks.

This item has been completed.

Gibraltar Dockyard Extension.

Total Estimate in the Act 1905 is £2,809,000, but in consequence of the omission of certain buildings, &c., the estimate was revised to £2,769,290.

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This Estimate will probably be exceeded by about £19,000. About £2,681,300 will be spent up to March 31st, 1908.

The date for completion, given in the 1905 Act, is 1907–8, but the scheme will probably not be entirely finished until 1909–10.

The three graving docks are in use. The stores and shops are nearly completed and a large part in use. Residences are in course of erection.

Hong Kong Dockyard Extension.

Total Estimate in the Act 1905, £1,500,000, revised, to £1,563,404, on account of engineering difficulties in connection with the work.

The expenditure incurred to March 31st, 1908, is expected to be about £1,326,000.

The expected date of completion, as shown in the 1905 Act, is 1907–8, but owing to typhoon and other causes it is not anticipated that the entire work will be finished until 1909–10. A saving is expected of about £25,000 on the revised total estimate.

Colombo Dock.

The Admiralty share of the cost of the dock, which is being carried out by the Colonial Government, is £159,000.

Of this sum about £150,000 is expected to be spent to March 31st, 1908.

The expected date of completion, as shown in the 1905 Act, is 1905–6, but the work has not made such rapid progress as anticipated, and some supplementary contingent works have still to be completed by the Colonial Government.

Pembroke Jetty, &c.

Total Estimate in the Act 1905, £133,500.

The work has been completed.

Portsmouth Widening Caisson.

This item has been completed.

Haulbowline Improvements.

This item has been completed.

Chatham Dock.

Total Estimate in the Act 1905, £450,000, revised to £448,352.

The work has been completed.

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Malta Dockyard Extension.

Total Estimate in the Act 1905, £1,250,000, but in consequence of the reduction of the Fleet in the Mediterranean the scheme has been modified and the estimate revised to £1,200,000. This estimate will probably be exceeded by about £7500.

About £1,158,500 is expected to be spent to March 31st, 1908.

The anticipated date of completion, as shown in the 1905 Act, is 1907–8.

The work on the main contract in connection with the item comprising the construction of the two docks and pumping station should have been completed by December 31st, 1904, but the construction of these docks was delayed by a variety of causes. They are now completed.

The erection of buildings and subsidiary services are in hand, and will probably be completed early in 1908–9.

Bermuda Dockyard Extension.

Total Estimate in the Act 1905, £600,000, revised to £590,000 (including works, machinery, and floating dock). A saving of £19,000 on last amount may possibly be effected.

About £561,500 is expected to be spent to March 31st, 1908, including £234,000 for the floating dock, which has been completed and is now at Bermuda.

The expected date of completion, as shown in the 1905 Act, is 1907–8.

The main contract in connection with this item is completed.

Simon's Bay Dockyard Extension.

Total Estimate in the Act 1905, £2,500,000. The scheme has been curtailed and the estimate revised to £2,104,076.

About £1,608,800 will be expended up to March 31st, 1908, including £432,000 chargeable to Navy Votes.

The date for completion given in the 1905 Act is 1908–9, but it is not expected now to be finished until 1909–10.

Coaling Facilities and Fuel Storage.

Total Estimate in the Act 1905, £1,280,000. The schemes have been modified, and the estimate revised to £1,020,000.

About £790,000 is expected to be spent to March 31st, 1908, including £40,000 chargeable to Navy Votes.

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Considerable difficulty has been experienced in obtaining sites in connection with some of the schemes, and it is not anticipated that the work provided for in the above estimate can be finished until 1909–10.

Chatham Dockyard Extension.

Total Estimate in the Act 1905, £70,000.

The preliminary work comprised in the above Total Estimate has been completed, but it has been decided not to proceed with the main scheme.

Sheerness Depôt for Torpedo-Boat Destroyers.

Total Estimate in the Act 1905, £220,000, revised to £180,404.

The work is practically completed, and a saving on revised estimate of about £8500 is expected.

Naval Establishment at Rosyth.

The sum of £200,000 for preliminary work was provided in the 1905 Act. This has been reduced to £165,000, which has been expended mainly on the purchase of land, the provision of residential and office accommodation, railway, &c., and the preparation of plans.

An item under the description "Naval Depôt" appears in Navy Vote 10, 1908–9.

Head (c).—NAVAL BARRACKS, &c.

Chatham Naval Barracks.

These Barracks are completed and occupied.

Gunnery Schools.

Total Estimate in the Act 1905, £470,000. The schemes have been considerably modified and the estimate revised to £170,000, on which a saving of about £16,000 is expected.

It is estimated that about £149,000 will have been expended by March 31st, 1908, on re-provision by War Department of accommodation given up by them to the Admiralty at Chatham, and erection of buildings at other stations.

The expected date of completion, as shown in the 1905 Act, is 1907–8, but the accommodation will not be entirely provided until 1908–9.

Portsmouth Naval Barracks.

These Barracks are completed and occupied.

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Keyham Naval Barracks.

These Barracks are completed and occupied.

Chatham Naval Hospital.

This Hospital is completed and occupied.

Walmer Marine Depôt.

This item has been completed.

Keyham Engineers' College.

This item has been completed.

"Britannia" R.N. College.

Total Estimate in the Act 1905, £425,000, revised to £410,000, through the omission of Seamen's Barracks. A saving of about £6500 on revised estimate has been effected.

The work is finished and the buildings have been occupied for some time.

Magazines.

Total Estimate in the Act 1905, £1,335,000. Various modifications to schemes have been effected, and the estimate revised to £1,158,048, on which a saving of about £60,000 is expected.

About £1,071,300 will be spent to March 31st, 1908.

The anticipated date of completion, as shown in the 1905 Act, is 1909–10, but in view of the smaller amount of work to be carried out it is anticipated that the item will be finished in 1908–9.

Haslar Hospital Extension.

This item has been completed.

Haulbowline Zymotic Hospital.

This item has been completed.

Coastguard Stations and R.N.R. Batteries.

Total Estimate in the Act 1905, £200,000, revised to £160,000, on which there is expected to be a saving of about £7000. The work is practically completed.

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Torpedo Ranges.

Total Estimate in the Act 1905, £320,000. The schemes have been considerably reduced, and the estimate revised to £115,000.

Of this sum about £30,000 is expected to be spent to March 31st, 1908.

The anticipated date of completion is shown in the 1905 Act as 1908–9, but owing to delay in acquiring sites the work will probably not be completed until 1909–10.

Electric Light and Power in Naval Establishments.

Total Estimate in the Act 1905, £1,750,000, revised to £1,549,000.

Of this sum about £1,435,200 is expected to be spent to March 31st, 1908.

The anticipated date of completion, as shown in the 1905 Act, is 1908–9.

Head (d).—SUPERINTENDENCE AND MISCELLANEOUS CHARGES.

Total Estimate in the Act 1905, £1,173,673, revised to £964,082, on which a saving of about £5000 is expected.

About £850,000 is expected to be spent to March 31st, 1908, including about £27,000, chargeable to Navy Votes.

March, 1908.

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III.—STATEMENT showing the AGGREGATE AMOUNT of MONEY expended for any purpose of the Naval Works Acts of 1895, 1896, 1897, 1899, 1901, 1903, and 1905, the purposes on which that money has been expended, and the sums authorised to be expended.

Works.	Total Estimated Cost Naval Works Act 1905.	Revised Total Estimated Cost.†	Aggregate Expenditure to 31st March, 1907.	Amounts Authorised to be expended out of Funds provided by Naval Works Acts.	Amounts authorised in excess of Expenditure.
(a) ENCLOSURE AND DEFENCE OF HARBOURS.	£	£	£ s. d.	£	£
Gibraltar*	1,199,000	1,206,400	1,206,279 11 6	1,174,852	—
Gibraltar, Commercial Mole	669,000	659,000	650,433 19 9	669,000	18,566 0 3
Portland	650,000	652,000	652,016 7 3	650,000	—
Dover	3,500,000	3,500,000	3,061,443 7 2	3,041,826	—
Malta Breakwater	950,000	625,000	194,600 8 2	381,675	187,074 11 10
(b) ADAPTING NAVAL PORTS TO PRESENT NEEDS OF FLEET.					
Deepening harbours and approaches	1,360,000	1,316,000	1,339,917 1 7	1,261,021	20,083 7 2
Keyham Dockyard extension	4,500,000	4,500,000	3,963,343 12 5	4,023,129	60,134 17 9
Portsmouth Docks	372,502	372,502	372,501 18 1	271,336	—
Gibraltar Dockyard extension	2,809,000	2,769,290	2,614,088 6 5	2,641,466	31,156 17 10
HongKongDockyard extension	1,500,000	1,563,404	1,255,987 19 6	1,359,500	103,512 0 6
Colombo Dock	159,000	159,000	149,530 0 0	159,000	9,470 0 0
Pembroke Jetty, &c.	133,500	133,500	96,536 1 3	132,796	36,963 14 2
Portsmouth—WideningCaisson	40,466	40,466	40,465 11 5	40,195	15 9
Haulbowline improvements	62,602	62,602	62,602 5 1	53,025	5
Chatham Dock	450,000	448,352	448,253 9 1	450,000	1,746 10 11
Malta Dockyard extension	1,250,000	1,200,000	1,048,070 0 3	1,087,247	39,176 19 9
Bermuda Dockyard extension	600,000	590,000	543,872 18 7	590,544	46,671 1 5
Simon's Bay Dockyard extension, &c.	2,500,000	2,104,076	1,176,383 0 3	1,221,872	45,488 19 9
Coaling facilities and fuel storage	1,280,000	1,020,000	749,862 6 5	1,150,381	400,518 13 7
Chatham Dockyard extension	70,000	70,000	68,225 6 4	70,000	1,774 13 8
Sheerness Depôt for Torpedo Boat Destroyers	220,000	180,404	154,421 7 5	218,045	63,623 12 7
Naval establishment at Rosyth	200,000	165,000	161,768 14 8	200,000	38,231 5 4
(c) NAVAL BARRACKS, &c.					
Chatham Naval Barracks	500,000	477,000	474,200 7 6	497,154	25,799 3 4
Gunnery Schools§	470,000	170,000	97,739 8 11	267,958	170,218 11 1
Portsmouth Naval Barracks	751,000	698,400	683,509 13 5	751,400	67,890 6 7
Keyham Naval Barracks	281,000	244,000	240,259 1 5	271,000	30,740 18 7
Chatham Naval Hospital	404,000	405,684	405,190 7 10	404,000	—
Walmer Marine Depôt	17,658	17,658	17,657 17 2	17,658	2 10
Keyham Engineers' College	23,298	23,298	23,297 14 4	23,298	5 8
"Britannia" R.N. College	425,000	410,000	402,830 17 4	425,000	22,169 2 8
Magazines	1,335,000	1,158,048	1,025,285 0 3	1,163,026	137,740 19 9
Haslar Hospital extension	67,978	67,978	67,978 2 3	67,978	—
Haulbowline Zymotic Hospital	12,856	12,856	12,855 12 9	12,586	7 3
CoastGuard Stations and Royal Naval Reserve Batteries	200,000	160,000	151,918 0 10	200,000	48,081 19 2
Torpedo Ranges	320,000	115,000	29,703 8 4	108,100	78,396 11 8
Electric light and power in Naval Establishments	1,750,000	1,549,000	1,128,849 19 1	1,345,650	216,800 0 11
(d) SUPERINTENDENCE AND MISCELLANEOUS CHARGES	1,173,673	964,082	790,016 3 1	950,012	159,995 16 11
	32,206,933	29,840,000	25,561,895 7 1‡	27,352,000	2,062,028 9 1

* This work has had the benefit of the use of the dredger, purchased out of voted moneys and valued at £16,656.
† *Cf.* Parliamentary Paper, Cd. 3384, March, 1907.
‡ Includes £241,819 15*s.* 1*d.* charged against Naval Votes in period prior to Naval Works Acts.
§ Includes the item formerly described as "Naval Barracks for Medway Gunnery School."

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Result of Test of Gunlayers with Heavy Guns in His Majesty's Fleet, 1907.

		1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
Number of ships that fired		139	136	121	127	139	134	108	100	89	121
Number of guns		1,010	1,121	1,031	1,137	1,241	1,296	1,171	1,096	1,073	1,365
Number of hits	1906 target	2,527	2,831	2,732	3,562	4,789	5,996	5,748	4,374	5,733	7,547
	1907 ,,	..	..	..	..	..	..	..	..	..	4,073
Number of misses	1906 ,,	5,436	6,219	5,709	6,244	6,863	7,028	7,664	3,357	2,328	1,991
	1907 ,,	..	..	..	..	..	..	..	..	..	5,465
Excess of hits over misses	1906 ,,	Nil	Nil	Nil	Nil	Nil	Nil	Nil	1,017	3,405	5,556
	1907 ,,	..	..	..	..	..	..	..	..	..	Nil
Excess of misses over hits	1906 ,,	2,909	3,418	2,977	2,682	2,074	1,032	1,916	Nil	Nil	Nil
	1907 ,,	..	..	..	..	..	..	..	..	..	1,392
Percentage of hits to rounds fired	1906 ,,	31·63	31·1	32·3	36·3	41·1	46·01	42·86	56·58	71·12	79·13
	1907 ,,	..	..	..	..	..	..	..	..	..	42·70
Hits per gun per minute—											
12″ and 10″	1906 target	·23	·29	·30	·33	·38	·53	·47	·58	·81	·61
	1907 ,,	..	..	..	..	..	..	..	..	..	·40
9·2″	1906 ,,	·32	·23	·22	·31	·35	·70	·73	1·40	2·84	3·25
	1907 ,,	..	..	..	..	..	..	..	..	..	2·01
7·5″	1906 ,,	..	..	..	..	..	..		..	..	3·48
	1907 ,,	..	..	..	..	..	..	..	..	..	1·58
6″ Q.F. and B.L.	1906 ,,	1·11	1·05	1·51	1·81	2·41	2·63	2·63	4·14	5·68	5·93
	1907 ,,	..	..	..	..	..	..	..	..	..	3·32
4·7″ and 4″ Q.F.	1906 ,,	1·68	1·82	1·60	1·93	2·02	2·47	2·28	3·73	4·96	5·73
	1907 ,,	..	..	..	..	..	..	..	..	..	2·38
Number of ships from whom no returns were received.		33	32	29	47	19	30	43	Nil	Nil	3

Abstract, 1907.

Order of Merit.	Fleet or Squadron.	No. of Ships.	No. of Men Firing.	Points per Man.	First Ship in Fleet.	Scores.
1	China	6	74	59·783	King Alfred	74·76
2	Atlantic and Second Cruiser	13	176	44·967	Albion	62·35
3	Mediterranean and Third Cruiser	14	175	42·990	Prince of Wales	62·98
4	Channel and First Cruiser	16	228	34·835	Vengeance	49·58
5	Home and Fifth Cruiser	41	468	34·206	Achilles	76·34
6	Australia	9	90	31·531	Powerful	50·00
7	East Indies	4	38	27·129	Perseus	34·34
8	Cape of Good Hope	3	29	24·613	Hermes	42·95
9	N. A. and W. I. and Fourth Cruiser	3	24	22·635	Indefatigable	36·32
10	Special Service, Tenders, &c.	12	63	21·830	Skipjack	38·89
	Total, 1907 Target	121	1,365	36·884		
	Total, 1906 Target	121	1,365	68·416		
	Total, 1906 Test	89	1,073	80·065		

Note.—It will be observed that the "Points per man" for 1907, on 1906 pattern target, is considerably lower than for 1906. This is due to the value per hit in 1907 being less than it was for the 1906 test. If the "Points per man" is calculated on the value per hit in 1906 test, the "Points per man" for 1907 will be 84·385.

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Test of Gunlayers, 1907.

12-in. B.L.

Time—1 Run of 2¾ minutes per Turret.

	Total Number of			Average per Turret per Minute	
	Turrets.	Rounds.	Hits.	Rounds.	Hits in 1906 target.
Totals 1907	61	455	..	2·712	1·276
„ 1906	60	422	..	2·558	1·630
				+0·154	−0·354
Formidable, 1st	2	16	11	2·91	2·0
Dreadnought* 5th	5	40	18	2·91	1·82
Africa . . 6th	2	20	6	3·64	2·91

* Dreadnought carried out a test, using three men for elevating and training; obtained 48 rounds, 35 hits, 25 bulls.

Gun.	Best Ship.	Total Number of			Average per minute. Rounds.	Hits per minute in 1906 target.
		Guns.	Rounds.	Hits.		
9·2-in., Mark X.*	Achilles, 5th Cruiser	6	57	48	4·75	4·58
Totals 1907		70	522	283	3·729	3·293
„ 1906		40	286	..	3·575	2·963
Difference		+30	+236	..	+0·154	+0·330
7·5-in. B.L.†	Achilles, 5th Cruiser	4	38	19	5·43	4·43
Totals 1907		56	480	151	4·898	3·510
„ 1906		52	401	..	4·409	3·231
Difference		+4	+79	..	+0·489	+0·279
6-in. B.L., Mark XI.‡	Black Prince, 2nd Cruiser	10	74	58	7·40	7·20
Totals 1907		50	364	210	7·280	6·520
„ 1906		20	152	..	7·600	6·550
Difference		+30	+212	..	−0·320	−0·030
6-in., Mark VII. & VIII.‡	King Alfred, China	16	176	96	11·00	10·25
Totals 1907		413	3077	1523	7·450	6·426
„ 1906		467	3687	..	7·895	5·970
Difference		−54	−610	..	−0·445	+0·456
6-in. Q.F.‡	Astraea, China	2	15	11	7·50	7·50
Totals 1907		181	1243	605	6·867	5·901
„ 1906		239	1616	..	6·762	5·042
Difference		−58	−373	..	+0·105	+0·859

* 1 run of 2 minutes. † 1 run of 1¾ minutes. ‡ 1 run of 1 minute.

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RESULTS OF TEST OF GUNLAYERS WITH HEAVY GUNS OF ALL SHIPS IN HIS MAJESTY'S FLEET, 1907; CLASSIFIED IN ORDER OF MERIT OF SHIPS COMPETING.

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Hits.	Per Minute. Rounds.	Per Minute. Hits.	Points per Man.	Best Shot in Ship.	Hits made by Best Shot.	Comparison with 1906 Results. Hits made on 1906 Pattern Target. 1906.	1907.
1	ACHILLES	1st	76·34	6	9·2″ Mark X.	57	48	4·75	4·00	94·08	J. German, Sgt., R.M.A.	10	..	55
				4	7·5″ B.L.	38	19	5·43	2·71	49·73	J. Smith, A.B.	6	..	31
2	King Alfred	2nd	74·76	2	9·2″ Mark X.	19	15	4·75	3·75	88·20	H. Carter, L.S.	8	10	19
				16	6″ B.L. VII. (*b*)	176	96	11·00	6·00	73·08	S. Dawson, L.S.	11	110	164
3	Prince of Wales	1st	62·98	2	12″ Mark IX.	15	7	2·73	1·27	38·89	W. Kent, P.O. (1)	4	..	8
				12	6″ B.L. VII. (*b*)	94	66	7·83	5·50	66·99	F. Ford, L.S.	8	..	90
4	Albion	1st	62·35	2	12″ Mark VIII.	13	5	2·36	0·91	27·78	R. Evans, P.O. (1)	4	..	6
				12	6″ Q.F.	91	64	7·58	5·33	68·11	W. Eastmead, P.O. (1)	9	..	89
5	Venus	2nd	60·90	11	6″ B.L. VII. (*b*)	93	55	8·45	5·00	60·90	R. Frame, Pte., R.M.L.I.	8	78	85
	Bedford	1st	60·90	12	6″ B.L. VII. (*b*)	83	60	6·92	5·00	60·90	W. Martleet, P.O. (1)	10	..	81
7	*Prince George*	1st	56·57	2	12″ Mark VIII.	10	6	2·22	1·33	40·74	H. Cross, P.O. (1)	4	..	6
				12	6″ Q.F.	79	51	7·18	4·64	59·21	C. Thomas, P.O. (2)	8	..	71
8	Albemarle	2nd	55·86	2	12″ Mark IX.	17	9	3·09	1·64	50·00	H. Turner, C.P.O.	7	6	12
				12	6″ B.L. VII. (*b*)	97	56	8·08	4·67	56·84	J. Ruff, P.O. (1)	9	62	88
9	Monmouth	2nd	55·83	12	6″ B.L. VII. (*b*)	102	55	8·50	4·58	55·83	J. Higgins, P.O. (1)	9	47	91
10	Formidable	1st	55·71	2	12″ Mark IX.	16	11	2·91	2·00	61·11	A. Bailey, P.O. (1)	7	..	11
				12	6″ B.L. VII. (*b*)	101	54	8·42	4·50	54·81	C. Brown, Gnr., R.M.A.	7	..	93
11	Black Prince	2nd	55·61	6	9·2″ Mark X.	48	25	4·00	2·08	49·00	A. White, P.O. (1)	6	21	45
				10	6″ B.L. XI.	74	53	7·40	5·30	59·57	B. King, Sgt., R.M.L.I.	7	60	72

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12	Astræa	1st	54·04	2	6″ Q.F.	15	11	7·50	5·50	70·24	C. Booth, P.O. (1)	6	..	15
				8	4·7″ Q.F.	79	36	9·88	4·50	50·00	R. Duffus, P.O. (1).	9	..	73
13	Victorious	1st	53·46	2	12″ Mark VIII,	14	3	2·55	0·55	16·67	J. Bull, P.O. (1)	2	..	4
				12	6″ Q.F.	86	56	7·17	4·67	59·59	W. Lincoln, P.O. (2)	6	..	80
14	Warrior	1st	53·08	6	9·2″ Mark X.	44	30	3·67	2·50	58·80	J. Turner, P.O. (2).	6	..	41
				4	7·5″ B.L.	35	17	5·00	2·43	44·50	H. Croton, A.B.	11	..	22
15	Kent	2nd	52·78	12	6″ B.L. VII. (*b*)	109	52	9·08	4·33	52·78	C. Roberts, Corp., R.M.L.I.	7	75	103
16	Cæsar	1st	52·19	2	12″ Mark VIII.	17	6	3·09	1·09	33·33	W. Thompson, C.P.O.	3	..	8
				12	6″ Q.F.	101	52	8·42	4·33	55·34	J. Berry, Bom., R.M.A.	7	..	93
17	Exmouth	1st	51·59	2	12″ Mark IX.	17	8	3·09	1·45	44·44	H. Long, P.O. (1)	5	..	12
				12	6″ B.L. VII. (*b*)	106	52	8·83	4·33	52·78	W. Lumley, P.O. (1)	9	..	93
18	Irresistible	1st	51·10	2	12″ Mark IX.	15	3	2·73	0·55	16·67	W. Clarke, P.O. (1)	2	..	6
				12	6″ B.L. VII. (*b*)	79	56	6·58	4·67	56·84	J. Lee, Act. Bom., R.M.A.	7	..	72
19	Flora	2nd	50·38	2	6″ Q.F.	16	9	8·00	4·50	57·47	C. Southard, P.O. (1)	6	6	16
				8	4·7″ Q.F.	66	35	8·25	4·38	48·61	T. Norsworthy, P.O. (1)	7	42	59
20	Powerful	2nd	50·00	2	9·2″ Mark VIII.	9	2	2·25	0·50	22·22	R. Weatherstone, C.P.O.	2	5	6
				16	6″ Q.F.	117	67	7·31	4·19	53·47	W. Teague, A.B.	7	93	113
21	Vengeance	2nd	49·58	2	12″ Mark VIII.	13	5	2·36	0·91	27·78	H. Bond, P.O. (1)	4	4	7
				12	6″ Q.F.	87	50	7·25	4·17	53·21	C. Buckland, P.O. (2)	6	67	75
22	London	1st	46·83	2	12″ Mark IX.	13	2	2·36	0·36	11·11	J. House, P.O. (1)	2	..	6
				12	6″ B.L. VII. (*b*)	80	52	6 67	4·33	52·78	E. Flaye, Sgt., R.M.A.	7	..	76
23	Cornwallis	2nd	46·67	2	12″ Mark IX.	10	4	1·82	0·73	22·22	A. Leworthy, P.O. (1)	2	7	6
				12	6″ B.L. VII. (*b*)	91	50	7·58	4·17	50·75	T. Loram, P.O. (2).	8	68	80
24	Duke of Edinburgh	2nd	46·51	6	9·2″ Mark X.	54	26	4·50	2·17	50·96	H. Metcalfe, Corp., R.M.L.I.	7	44	47
				10	6″ B.L. XI.	89	39	8·90	3·90	43·84	H. Foster, Bom., R.M.A.	7	71	81
25	Russell	2nd	46·11	2	12″ Mark IX.	14	0	2·55	0·00	0·00	. . . .	0	7	3
				12	6″ B.L. VII. (*b*)	103	53	8·58	4·42	53·80	N. Fenning, A.B.	8	74	86
26	Africa	1st	45·42	2	12″ Mark IX.	20	7	3·64	1·27	38·89	S. Church, C.P.O.	4	..	10
				4	9·2″ Mark X.	28	16	3·50	2·00	47·04	A. Church, P.O. (2)	5	..	28
				10	6″ B.L. XI.	78	41	7·80	4·10	46·08	E. Stone, Sgt., R.M.A.	9	..	70
27	*Niobe*	1st	45·27	16	6″ Q.F.	99	52	6·75	3·55	45·27	A. Skedgill, P.O. (2)	5	..	89
	Amphitrite	1st	45·27	16	6″ Q.F.	97	52	6·61	3·55	45·27	R. Penny, P.O. (1).	6	..	80
29	Ocean	2nd	45·25	2	12″ Mark VIII.	13	3	2·36	0·55	16·67	C. Taylor, P.O. (1)	3	4	5
				12	6″ Q.F.	90	47	7·50	3·92	50·02	J. Price, Gnr., R.M.A.	6	43	81

(*b*) = ½ charges.

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Results of Test of Gunlayers with Heavy Guns—*continued.*

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Hits	Per Minute. Rounds.	Per Minute. Hits.	Points per Man.	Best Shot in Ship.	Hits made by Best Shot.	Comparison with 1906 Results. Hits made on 1906 Pattern Target. 1906.	1907.
30	Venerable	2nd	45·01	2	12" Mark IX.	17	3	3·09	0·55	16·67	R. Lutman, C.P.O.	3	10	8
				12	6" B.L. VII. (*b*)	83	49	6·92	4·08	49·74	B. Cooper, P.O. (2)	7	68	77
31	Britannia	1st	43·96	2	12" Mark IX.	20	6	3·64	1·09	33·33	G. Fisher, C.P.O.	5	..	16
				4	9·2" Mark X.	34	14	4·25	1·75	41·16	H. Wilkes, A.B.	7	..	26
				10	6" B.L. XI.	60	42	6·00	4·20	47·21	J. Watkins, L.S.	9	..	55
32	Drake	1st	43·84	2	9·2" Mark X.	13	6	3·25	1·50	35·28	H. Brook, P.O. (1)	3	..	13
				16	6" B.L. VII. (*b*)	126	59	7·88	3·69	44·91	J. Topp, Corp., R.M.A.	7	..	103
33	Implacable	1st	43·19	2	12" Mark IX.	13	4	2·36	0·73	22·22	J. Stone, P.O. (1)	4	..	7
				12	6" B.L. VII. (*b*)	94	46	7 83	3·83	46·69	F. Moffatt, P.O. (1)	7	..	83
34	Juno	2nd	43·18	11	6" B.L. VII. (*b*)	80	39	7·27	3·55	43·18	E. Bearne, A.B.	8	60	72
35	Hermes	2nd	42·95	11	6" Q.F.	89	37	8·09	3·36	42·95	O. Scholey, A.B.	9	37	71
36	Bacchante	1st	42·45	2	9.2" Mark X.	12	6	3·00	1·50	35·28	W. Neve, P.O. (1)	4	..	10
				12	6" B.L. VII. (*b*)	89	43	7·42	3·58	43·65	H. Woods, L.S.	6	..	79
37	Magnificent	1st	42·40	2	12" Mark VIII.	14	4	2·55	0·73	22·22	J. Orgee, P.O. (1)	2	..	8
				12	6" Q.F.	82	43	6·83	3·58	45·76	J. Barker, P.O. (2)	7	..	71
38	Challenger	2nd	42·08	11	6" B.L. VII. (*b*)	81	38	7·36	3·45	42·08	S. Roskruge, P.O. (1)	7	52	70
39	*Goliath*	1st	41·79	2	12" Mark VIII.	11	0	2·44	0·00	0·00	——	0	..	0
				12	6" Q.F.	63	42	5·73	3·82	48·76	R. Liddle, Gnr., R.M.A.	6	..	58
40	*Cressy*	1st	40·93	2	9·2" Mark X.	13	11	3·71	3·14	73·92	E. Jefkins, P.O. (1)	6	..	13
				12	6" B.L. VII. (*b*)	63	32	5·73	2·91	35·43	E. Ward, L.S.	5	..	57
41	Devonshire	2nd	40·92	4	7·5" B.L.	34	10	4·86	1·43	26·18	J. Harries, P.O. (1)	8	28	28
				6	6" B.L. VII. (*b*)	35	25	5·83	4·17	50·75	S. Emmett, C.P.O.	7	33	31
42	Jupiter	2nd	40·69	2	12" Mark VIII.	12	3	2·18	0·55	16·67	G. Sharpe, P.O. (1)	3	10	3
				12	6" Q.F.	80	42	6·67	3·50	44·70	W. Rothwell, P.O. (2)	8	54	77
43	Dreadnought	1st	40·03	5	12" Mark X.	40	18	2·91	1·31	40·00	J. Bylett, P.O. (1)	5	..	25

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44	Encounter	2nd	39·86	11	6″ B.L. VII. (*b*)	85	36	7·73	3·27	39·86	T. Dawson, A.B.	8	45	62
	Minerva	1st	39·86	11	6″ B.L. VII. (*b*)	78	36	7·09	3·27	39·86	E. Hignett, P.O. (1)	7	..	65
46	Cambrian	2nd	39·55	2	6″ Q.F.	13	4	6·50	2·00	25·54	C. White, Sgt., R.M.L.I.	3	5	9
				8	4·7 Q.F.	58	31	7·25	3·88	43·05	W. Wedlake, P.O. (1)	6	22	54
47	Skipjack	2nd	38·89	2	4·7″ Q.F.	16	7	8·00	3·50	38·89	W. Kingdom, A.B.	4	11	15
48	Cochrane	1st	38·82	6	9·2″ Mark X.	43	25	3·58	2·08	49·00	F. Hart, P.O. (1)	6	..	37
				4	7·5″ B.L.	26	9	3·72	1·29	23·56	G. Allen, P.O. (2)	3	..	20
49	*Cornwall*	1st	38·76	12	6″ B.L. VII. (*b*)	85	35	7·73	3·18	38·76	J. Hyatt, P.O. (2)	5	..	68
50	King Edward VII.	1st	37·20	2	12″ Mark IX.	17	9	3·09	1·64	50·00	H. Beaumont, C.P.O.	5	..	10
				4	9·2″ Mark X.	30	10	3·75	1·25	29·40	T. Ferrie, P.O. (1)	4	..	22
				10	6″ B.L. VII. (*a*)	72	31	7·20	3·10	37·76	E. Catt, C.P.O.	6	..	56
51	Diana	1st	36·54	11	6″ B.L. VII. (*b*)	82	33	7·45	3·00	36·54	J. Hatherley, P.O. (1)	5	..	66
52	Indefatigable	2nd	36·32	2	6″ Q.F.	13	1	6·50	0·50	6·39	A. Hickman, P.O. (1)	1	7	3
				6	4·7″ Q.F.	59	25	9·83	4·17	46·29	A. Shotbolt, Sgt., R.M.L.I.	7	32	47
53	Queen	1st	35·44	2	12″ Mark IX.	15	3	2·72	0·55	16·67	J. Gallagher, P.O. (1)	3	..	4
				12	6″ B.L. VII. (*b*)	82	38	6·83	3·17	38·57	E. Edwardes, Sgt., R.M.A.	6	..	71
54	*Argonaut*	1st	34·83	16	6″ Q.F.	97	40	6·61	2·73	34·83	F. Fowler, A.B.	7	..	87
55	Natal	1st	34·76	6	9·2″ Mark X.	46	26	3·83	2·17	50·96	A. Nixon, Sgt., R.M.A.	7	..	42
				4	7·5″ B.L.	30	4	4·29	0·57	10·47	J. Davidson, P.O. (1)	3	..	13
56	Argyll	2nd	34·66	4	7·5″ B.L.	47	11	6·71	1·57	28·79	F. Chapman, P.O. (1)	3	35	41
				6	6″ B.L. VII. (*b*)	33	19	5·50	3·17	38·57	M. Smith, P.O. (1)	6	17	29
57	Perseus	2nd	34·34	8	4″ Q.F.	59	21	9·83	3·50	34·34	A. Reed, P.O. (2)	7	19	49
58	New Zealand	1st	33·62	2	12″ Mark IX.	18	6	3·27	1·09	33·33	W. Bolt, P.O. (1)	6	..	7
				4	9·2″ Mark X.	22	9	2·75	1·13	26·46	S. Kennell, A.B.	5	..	18
				10	6″ B.L. VII. (*a*)	70	30	7·00	3·00	36·54	C. Hayman, P.O. (1)	6	..	63
59	Lancaster	2nd	33·50	12	6″ B.L. VII. (*b*)	87	33	7·25	2·75	33·50	C. Darmes, P.O. (2)	5	71	76
60	Leda	1st	33·33	2	4·7″ Q.F.	13	6	6·50	3·00	33·33	S. Macey, P.O. (1)	3	..	11
61	*Berwick*	1st	33·23	12	6″ B.L. VII. (*b*)	88	30	8·00	2·73	33·23	H. Neal, P.O. (1)	5	..	70
62	Antrim	1st	32·91	4	7·5″ B.L.	39	7	5·57	1·00	18·32	F. Davenport, P.O. (1)	6	..	26
				6	6″ B.L. VII. (*a*)	49	21	8·16	3·50	42·63	E. Cribb, A.B.	6	..	42
63	*Canopus*	1st	32·84	2	12″ Mark VIII.	9	0	2·00	0·00	00·00	.. ..	..	..	2
				12	6″ Q.F.	80	33	7·27	3·00	38·31	W. Selby, C.P.O.	7	..	64
64	Britomart	1st	32·70	2	4″ Q.F.	13	5	8·67	3·33	32·70	W. Hayes, P.O. (1)	3	..	8
65	*Isis*	1st	32·62	11	6″ B.L. VII. (*b*)	73	27	7·24	2·68	32·62	W. Edwards, P.O. (2)	4	..	55

(*a*) = full or ⅔ charges. (*b*) = ½ charges.

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Results of Test of Gunlayers with Heavy Guns—*continued.*

Order of Merit.	Ship.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Hits.	Per Minute.		Points per Man.	Best Shot in Ship.	Hits made by Best Shot.	Comparison with 1906 Results.	
								Rounds.	Hits.				Hits made on 1906 Pattern Target.	
													1906.	1907.
66	Amethyst	1st	31·61	12	4″ Q.F.	84	29	9·33	3·22	31·61	E. Rideout, A.B.	5	..	58
67	Hibernia	1st	31·61	2	12″ Mark IX.	15	1	2·73	0·18	5·56	C. Webber, P.O. (1)	1	..	3
				4	9·2″ Mark X.	19	8	2·38	1·00	23·52	F. Paul, C.P.O.	5	..	14
				10	6″ B.L. XI.	63	35	6·30	3·50	39·34	J. Richards, P.O. (1)	7	..	48
68	*Gladiator*	1st	30·65	10	6″ Q.F.	62	22	6·76	2·40	30·65	J. Meech, P.O. (1)	6	..	48
69	Aboukir	1st	30·30	2	9·2″ Mark X.	14	5	3·50	1·25	29·40	C. Thacker, P.O. (1)	3	..	11
				12	6″ B.L. VII. (*b*)	73	30	6·08	2·50	30·45	J. Folley, P.O. (2)	4	..	57
	Circe	1st	30·30	2	4·7″ Q.F.	11	5	6·00	2·73	30·30	W. Flower, A.B.	4	..	8
71	Duncan	2nd	30·22	2	12″ Mark IX.	12	3	2·18	0·55	16·67	F. Hinton, P.O. (1)	2	5	4
				12	6″ B.L. VII. (*b*)	85	32	7·08	2·67	32·48	A. Beck, P.O. (1)	5	51	66
72	Highflyer	1st	30·18	11	6″ Q.F.	67	26	6·09	2·36	30·18	A. Collings, P.O. (1)	6	..	58
73	Swiftsure	2nd	29·76	2	10″ B.L.	11	2	2·75	0·50	18·18	J. Read, L.S.	2	4	4
				14	7·5″ B.L.	93	42	3·80	1·71	31·41	J. Kirkby, P.O. (1)	6	47	72
74	*Ariadne*	1st	29·60	16	6″ Q.F.	91	34	6·20	2·32	22·60	J. Hudson, Pte. R.M.L.I.	5	..	69
75	Bulwark	1st	29·35	2	12″ Mark IX.	15	3	2·73	0·55	16·67	A. Dark, P.O. (1)	3	..	3
				12	6″ B.L. VII. (*b*)	71	31	5·92	2·58	31·47	F. Powell, Gnr., R.M.A.	5	..	63
76	*Dido*	1st	29·00	11	6″ B.L. VII. (*b*)	70	24	6·94	2·38	29·00	W. Wingrove, A.A.	5	..	54
77	Commonwealth	1st	28·36	2	12″ Mark IX.	15	3	2·73	0·55	16·67	F. Baker, P.O. (1)	2	..	7
				4	9·2″ Mark X.	30	14	3·75	1·75	41·16	A. Teppett, C.P.O.	6	..	29
				10	6″ B.L. VII. (*a*)	68	21	6·80	2·10	25·58	A. Attwood, Act. Bom., R.M.A.	7	..	47
78	Shearwater	1st	28·34	6	4″ Q.F.	48	13	10·67	2·89	28·34	H. Bourne, A.B.	4	..	38
	Cadmus	1st	28·34	6	4″ Q.F.	42	13	9·33	2·89	28·34	W. Beckman, A.B.	4	..	28
80	Hyacinth	1st	27·86	11	6″ Q.F.	71	24	6·45	2·18	27·86	F. Maycock, A.B.	5	..	57

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81	*Hannibal*	1st	27·78	2	12″ Mark VIII.	8	3	1·78	0·67	20·37	C. Bellamy, P.O. (2)	2	..	4
				12	6″ Q.F.	66	25	6·00	2·27	29·02	T. Howley, Gnr., R.M.A.	5	..	51
83	Halcyon	1st	27·78	2	4·7″ Q.F.	17	5	8·50	2·50	27·78	T. Orange, A.B.	3	..	13
	Suffolk	2nd	27·41	12	6″ B.L. VII. (*b*)	95	27	7·92	2·25	27·41	A. Guyatt, Lce.-Sgt., R.M.L.I.	5	50	70
84	Sapphire	1st	27·25	12	4″ Q.F.	66	25	7·33	2·78	27·25	E. Witherdon, L.S.	5	..	58
85	Majestic	1st	26·33	2	12″ Mark VIII.	12	1	2·18	0·18	5·56	C. Rhymes, C.P.O.	1	..	3
				12	6″ Q.F.	74	28	6·17	2·33	29·80	Everitt, Gnr., R.M.A.	7	..	55
86	*Diadem*	1st	26·12	16	6″ Q.F.	84	30	5·73	2·05	26·12	F. Grevett, P.O. (2)	5	..	62
87	Barham	1st	25·92	6	4·7″ Q.F.	55	14	9·17	2·33	25·92	C. Tozer, A.B.	4	..	69
88	*Charybdis*	1st	25·15	2	6″ Q.F.	7	5	3·82	2·73	34·83	W. Goodwin, Corp., R.M.L.I.	5	..	6
				8	4·7″ Q.F.	46	15	6·27	2·05	22·73	W. Sherry, A.B.	4	..	39
89	Topaze	1st	25·07	12	4″ Q.F.	76	23	8·44	2·56	25·07	V. Crayford, Pte., R.M.L.I.	4	..	55
90	*Andromeda*	1st	24·38	16	6″ Q.F.	82	28	5·59	1·91	24·38	J. Nolan, A.B.	4	..	66
91	*Speedwell*	1st	24·24	2	4·7″ Q.F.	14	4	7·64	2·18	24·24	E. Foster, C.P.O.	4	..	10
92	Diamond	1st	23·98	12	4″ Q.F.	82	22	9·11	2·44	23·98	E. Cotter, A.B.	5	..	57
93	*Donegal*	1st	23·25	12	6″ B.L. VII. (*b*)	63	21	5·73	1·91	23·25	W. Jago, P.O. (1)	4	..	40
94	Triumph	2nd	23·21	2	10″ B.L.	8	2	2·00	0·50	18·18	T. Taylor, P.O. (1)	1	7	3
				14	7·5″ B.L.	138	32	5·63	1·31	23·93	C. Heath, P.O. (1)	7	72	91
95	*Doris*	1st	22·96	11	6″ B.L. VII. (*b*)	67	19	6·64	1·88	22·96	M. Phillips, A.B.	4	..	52
96	Psyche	2nd	22·89	8	4″ Q.F.	65	14	10·83	2·33	22·89	T. Balls, A.B.	6	19	44
97	Illustrious	2nd	22·57	2	12″ Mark VIII.	13	2	2·36	0·36	11·11	A. Browning, P.O. (1)	1	4	2
				12	6″ Q.F.	67	23	5·58	1·92	24·48	J. Bateman, Act. Bom., R.M.A.	6	52	50
98	*Carnarvon*	1st	22·52	4	7·5″ B.L.	26	13	4·33	2·17	39·70	G. Cowling, P.O. (1)	5	..	18
				6	6″ B.L. VII. (*a*)	28	5	5·09	0·91	11·07	T. McDermid, Pte., R.M.L.I.	3	..	22
99	Talbot	1st	22·15	11	6″ B.L. VII. (*b*)	64	20	5·82	1·82	22·15	G. Bale, P.O. (1)	6	..	49
100	*Mars*	1st	21·79	2	12″ Mark VIII.	10	4	2·22	0·89	27·16	H. Brady, P.O. (1)	3	..	6
				12	6″ Q.F.	66	18	·00	1·64	20·90	R. Harriman, Corp., R.M.A.	3	..	49
101	*Vindictive*	1st	20·90	10	6″ Q.F.	57	15	6·22	1·64	20·90	F. Mizen, P.O. (2)	3	..	35
102	*Bonaventure*	1st	20·60	2	6″ Q.F.	11	4	6·00	2·18	27·86	G. Kinch, P.O. (1)	3	..	7
				6	4·7″ Q.F.	32	9	5·82	1·64	18·18	J. Barrett, P.O. (2)	2	...	20

(*a*) = full or ⅔ charges

(*b*) = ½ charges.

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Result of Test of Gunlayers with Heavy Guns—*continued.*

Order of Merit.	Ships.	Whether 1st or 2nd Firing.	Points.	No. of Men Firing.	Guns.	Rounds.	Hits.	Per Minute.		Points per Man.	Best Shot in Ship.	Hits made by Best Shot.	Comparison with 1906 Results.	
								Rounds.	Hits.				Hits made on 1906 Pattern Target.	
													1906.	1907.
103	Leviathan	1st	19·62	2	9·2″ Mark X.	9	0	2·25	0·00	0·00	.. ..	0	..	4
				16	6″ B.L. VII. (*b*)	81	29	5·06	1·81	22·08	E. Biddlecombe, Bomb., K.M.A.	9	..	55
	Pyramus	2nd	19·62	8	4″ Q.F.	55	12	9·17	2·00	19·62	F. Healds, A.B.	4	29	43
105	Pioneer	2nd	17·99	8	4″ Q.F.	41	11	6·83	1·83	17·99	A. Thomas, C.P.O.	4	12	20
106	Furious	1st	17·88	10	6″ Q.F.	56	14	5·60	1·40	17·88	W. Copus, L.S.	3	..	40
107	Scylla	1st	16·67	2	6″ Q.F.	8	0	4·00	0·00	0·00	.. ..	0	..	3
				6	4·7″ Q.F.	50	12	8·33	2·00	22·22	C. Perchard, A.B.	5	..	36
108	Clio *	1st	16·05	6	4″ Q.F.	45	9	8·18	1·64	16·05	H. Wigmore, A.B.	2	..	29
109	Brilliant	2nd	14·93	2	6″ Q.F.	8	5	4·60	2·50	31·93	F. Jacob, P.O. (1)	5	8	5
				6	4·7″ Q.F.	52	5	8·67	0·83	9·26	E. Cam. Corp., R.M.L.I.	2	26	20
110	Proserpine	1st	14·72	8	4″ Q.F.	54	9	9·00	1·50	14·72	F. Foord, A.B.	3	..	28
111	Eclipse	1st	14·04	5	6″ Q.F.	27	5	5·89	1·09	13·93	C. Rose, P.O. (1)	2	..	20
				6	4·7″ Q.F.	42	7	7·64	1·27	14·14	A. Miller, L.S.	3	..	23
112	Hermione	1st	13·66	2	6″ Q.F.	12	2	6·00	1·00	12·77	O. Vesey, P.O. (1)	1	..	7
				8	4·7″ Q.F.	65	10	8·13	1·25	13·89	A. Ewens, L.S.	5	..	21
113	Thistle	1st	13·08	2	4″ Q.F.	14	2	9·33	1·33	13·08	A. Avery, P.O. (2)	2	..	9
	Prometheus	1st	13·08	8	4″ Q.F.	51	8	8·50	1·33	13·08	G. Trout, A.B.	2	..	24
	Pelorus	2nd	13·08	8	4″ Q.F.	48	8	8·00	1·33	13·08	E. Highams, P.O. (2)	2	23	23
116	*Essex*	1st	12·18	12	6″ B.L. VII. (*b*)	65	11	5·91	1·00	12·18	O. Wiles, P.O. (1)	3	..	37
117	*Jason* *	1st	7·41	2	4·7″ Q.F.	10	1	6·67	0·67	7·41	H. Gower, A.B.	1	..	5
118	Pegasus	1st	6·54	8	4″ Q.F.	43	4	7·17	0·67	6·54	J. Jones, Sgt., R.M.L.I.	1	..	18
119	*Speedy*	1st	6·06	2	4·7″ Q.F.	10	1	5·45	0·55	6·06	G. Childerhouse, A.B.	1	..	6
120	*Spanker*	1st	0·00	2	4·7″ Q.F.	16	0	8·73	0·00	0·00	.. .. ..	0	..	6
121	Bramble	1st	0·00	2	4″ Q.F.	15	0	10·00	0·00	0·00	.. .. ..	0	..	7

(*b*) = ¼ charges.

NOTE.—Ships in italics fired under special conditions for nucleus crew vessels.

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BATTLE PRACTICE.

Abstract of Results of Battle Practice in H.M. Fleet, 1907

(With average points obtained in 1906).

Order of Merit.	Squadron.	No. of Ships.	No. of Guns.	Average Points. 1907.	Average Points. 1906.	First Ship in Squadron.	Score.
1	China	5	70	297·16	250·6	Kent . . .	527·26
2	Home Fleet . . .	20	276	237·39	—	Dreadnought .	410·00
3	Mediterranean . .	12	161	207·73	203·0	Queen . . .	339·48
4	Atlantic	10	140	164·82	233·2	Albemarle . .	210·74
5	Australia	7	72	158·38	78·7	Pegasus . .	287·00
6	Channel Fleet . .	16	256	140·83	146·0	Hibernia . .	225·50
7	Cape of Good Hope .	3	29	128·47	180·8	Hermes . .	209·10
	Total 1907 . .	73	1,004	194·02	—		
	Total 1906 . .	67	945	181·7	—		
	Total 1905 . .	68	957	98·4	—		

Note.—In Home Fleet second and third ships were ships with nucleus crews.

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Austro-Hungarian Navy Estimates, 1908-9.

(Converted at £1 = 24 Kronen.)

Heads of Expenditure.	Proposed for financial year 1908.	Granted for financial year 1907.
	£	£
ORDINARY ESTIMATES.		
Pay of Officers, etc.	207,582	187,725
Pay and Clothing—petty officers and seamen	184,482	164,884
Land Service	93,427	87,216
Sea Service	264,105	228,804
Shore Establishments	28,848	24,817
Maintenance of Fleet	425,905	394,916
New Construction, viz.:—		
(A) Hulls and Machinery: Battleship I., 14,500 tons	208,333	166,667
(A) Hulls and Machinery: Battleship II., 14,500 tons	83,333	104,167
(A) Hulls and Machinery: Battleship III., 14,500 tons	83,333	41,667
(A) Hulls and Machinery: Cruiser F	83,333	41,667
(A) Hulls and Machinery: 12 Torpedo-boats, 100 tons	41,667	—
(B) Guns and torpedo fittings, &c.—Battleships I., II. and III. and Cruiser F	216,667	62,500
Guns and Small Arms	145,042	120,833
Miscellaneous	175,947	169,768
	2,242,004	1,795,631
Less Special Receipts	11,874	10,208
Total of Ordinary Estimates	2,230,130	1,785,423
EXTRAORDINARY ESTIMATES.		
Shore Establishments	937	4,167
Floating-Dock	62,500	41,667
Guns and Small Arms	38,750	32,500
Buildings	30,583	15,812
Miscellaneous	12,100	12,100
Total of Ordinary and Extraordinary Estimates.	£2,375,000	£1,891,669

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French Navy Estimates, 1908.

Cap. in Estimates, 1908.	Heads of Expenditure.	Credits voted for 1908.	Credits voted for 1907.
	PERSONNEL.	£	£
1, 2	Admiralty Office	152,145	145,019
5, 6, 7	Navy Pay	2,270,803	2,172,628
8	Inspection of Administrative Services .	13,137	13,138
9, 10	Construction and Ordnance Staff . .	299,880	286,347
11, 12, 14, 15	Administrative Staff, Commissariat, and Inscription Maritime	312,421	289,314
13	Medical and Religious Staff . . .	73,280	70,022
52	Fisheries and Navigation . . .	33,276	31,125
	LABOUR.		
	Wages—		
27	Shipbuilding; new construction; fitting for sea	485,600	485,200
29	Shipbuilding; repairs	236,000	236,000
24, 31	Master-attendants' and Storekeepers' Departments	269,043	267,043
35	Armaments; construction of new guns .	94,365	94,365
37, 39	Armaments; repairs	109,071	109,231
42	Works	21,240	26,000
18	Victualling	32,400	32,400
20	Hospitals, &c.	16,780	16,780
	MATÉRIEL.		
	Stores and Supplies—		
3	Admiralty	7,680	10,077
28	Shipbuilding in Dockyards . . .	1,558,440	1,612,800
33, 34	Shipbuilding by contract . . .	1,724,000	1,417,600
30, 32	Fitting for sea; maintenance; repairs .	535,016	540,000
	Carried forward . .	£8,244,577	£7,855,089

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Cap. in Estimates, 1908.	Heads of Expenditure.	Credits voted for 1908.	Credits voted for 1907.
		£	£
	Brought forward - -	8,244,577	7,855,089
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
25, 26	Repairs, conversions, &c., in dockyards and by contract	617,568	644,407
36, 38 40	Armaments; new guns and conversions; Powder, ammunition, repairs, tools, &c.	1,140,712	1,212,552
43	Works; new and large alterations. .	69,800	102,600
41, 44	Ditto; supplementary for defence of military ports	604,800	614,000
46, 47	Ditto; repairs	57,654	67,055
45	New Naval Hospital, Toulon . .	36,000	—
4	Hydrographic Service	13,600	13,600
16	Clothing, &c.	144,768	137,412
17, 19	Victualling	861,343	883,740
21	Hospitals, &c.	75,584	75,585
48, 49	Fuel, lighting, office furniture, printing, &c.	44,311	43,930
	MISCELLANEOUS.		
22, 23	Travelling expenses, freight, allowance for lodgings, &c.	219,680	199,720
50	Charitable and subscriptions . . .	44,752	43,590
51	Pay of Reserve Officers	33,893	33,011
53	Fisheries and Commerce (materials for protection, &c.)	18,240	18,440
	Bordeaux Exhibition	—	400
54	Mercantile Marine; Travelling expenses.	5,800	—
55	Pensions	560,221	537,661
56	Secret Service	4,000	4,000
	Total . .	£12,797,303	£12,486,792

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PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1908.—BUILDING IN DOCKYARDS.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1908.
					£	£
Battleships	Danton	Brest	1907	1910	1,933,200	356,864
	Mirabeau	Lorient	1907	1910	1,933,200	356,864
Armoured Cruisers, First-class	Jules-Michelet	Lorient	1904	1908	1,174,658	12,056
	Edgar-Quinet	Brest	1905	1910	1,280,181	358,890
	Waldeck-Rousseau	Lorient	1906	1910	1,290,001	348,991
Torpedo-boat Destroyers	Pierrier	Rochefort	1904	1908	63,351	4,800
	Carquois	„	1905	1908	59,568	2,546
	Trident	„	1905	1908	59,568	3,896
	Glaive	„	1905	1909	60,274	13,528
	Poignard	„	1905	1909	60,274	13,738
	Cognée	Toulon	1905	1908	56,560	17,783
	Hache	„	1906	1908	56,560	18,045
	Massue	„	1906	1908	56,560	19,040
Submersible	Oméga	Toulon	1904	1908	59,596	7,324
3 Submarines	Saphir, Topaze, Turquoise	Toulon	1905	1908	236,499	34,266
Submersibles	Circé, Calypso	Toulon	1905	1908	134,535	25,729
Submarines	Guêpes (1 & 2)	Cherbourg	1904	1908	11,912	3,570
38 Submersibles & 15 Submarines	Q 51-60, Q 62 & 63, Q 64-66, Q 67-69, Q 70-72, Q 73, Q 74, Q 75-81, Q 82, Q 83-88, Q 89, Q 90 & 91, Q 92-94, Q 95-99, Q 100-104	Rochefort, Toulon, Cherbourg	—	—	3,327,549	692,451
	Total building in Dockyards				£ 11,854,046	2,290,381

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Programme of New Construction, to be continued or undertaken in 1908.—Building by Contract.

Class.	Names of Ships.	Where Building and to be Completed.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1908.
					£	£
Battleships	Liberté	St. Nazaire—Brest	1902	1907	1,633,026	68,905
	Justice	La Seyne—Toulon	1902	1907	1,645,481	88,539
	Vérité	Bordeaux—Brest	1902	1907	1,642,450	111,434
	Voltaire	La Seyne—Toulon	1906	1911	2,083,649	273,520
	Diderot	St. Nazaire—Brest	1906	1911	2,083,649	273,520
	Condorcet	„ „	1906	1911	2,081,649	273,520
	Vergniaud	Bordeaux—Toulon	1906	1911	2,081,649	286,320
First-class Armoured Cruiser	Ernest Renan	St. Nazaire—Toulon	1903	1908	1,400,681	233,165
Torpedo Boat Destroyers	Sabretache	Nantes—Lorient	1905	1908	103,143	51,075
	Oriflamme	„ „	1905	1908		
	Etendard	Bordeaux—Rochefort	1905	1908	111,063	54,995
	Fanion	„ „	1905	1908		
	Sape	Rouen—Cherbourg	1905	1907	120,023	6,400
	Gabion	„ „	1905	1907		
	Branlebas	Le Havre—Cherbourg	1905	1908	131,223	37,636
	Fanfare	„ „	1905	1908		
	Spahi	„ „	1906	1908	76,257	32,503
	Voltigeur	Nantes—Lorient	1906	1909	87,257	23,748
	Tirailleur	Bordeaux—Lorient	1906	1909	86,257	23,748
	Chasseur	Le Havre—Cherbourg	1906	1909	85,457	23,748
	Hussard	Lorient	1906	1908	75,657	31,903
	Carabinier	Rouen—Cherbourg	1906	1908	76,857	33,103
	M 61 to M 65	—	1908	1910	406,285	81,248
	M 66 to M 75	—	1908	1911	812,570	20,000
	Total building by Contract				£16,824,283	2,029,030

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German Navy Estimates, 1908.

(*Converted at* £1 = 20·43 *marks.*)

Ordinary Permanent Estimates.

Heads of Expenditure.	Proposed for the financial year 1908.	Granted for the financial year 1907.
	£	£
Imperial Navy Office	99,579	92,929
Admiralty Staff	15,377	15,141
Look-out Stations and Observatories	18,496	17,942
Station Superintendencies	33,508	30,247
Administration of Justice	8,940	8,336
Naval Chaplains and Garrison Schools	8,144	6,843
Navy Pay	1,533,196	1,420,982
Maintenance of Ships in Commission	1,783,015	1,527,027
Victualling	113,183	106,528
Clothing	21,367	21,551
Garrison Works and Administration	91,724	79,918
Lodging Allowance	132,975	125,161
Medical Department	121,897	113,448
Travelling Expenses, Freight Charges, &c.	154,076	166,960
Training Establishments	24,031	24,109
Maintenance of Fleet and Docks	1,592,421	1,448,779
Ordnance and Fortification	627,559	547,941
Accountants' Department	47,587	45,064
Pilotage, Coastguard, and Surveying Service	37,014	35,944
Miscellaneous Expenses	79,507	76,426
Total of Ordinary Permanent Estimates, carried to next page	£ 6,543,596	5,911,276
Administration of Kiau-chau Protectorate	5,647	5,085
	6,549,243	5,916,361

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Special Ordinary Estimates.

Shipbuilding Programme for the Financial Year 1908.

For the Construction of—	£
Battleship Schleswig-Holstein (Q), 4th and final instalment	115,027
„ Schlesien (R), „	115,027
Large cruiser Scharnhorst (D), „	73,420
Battleship Ersatz Bayern, 3rd instalment	283,896
„ Ersatz Sachsen „	283,896
Large cruiser (E), „	244,738
Small cruiser Ersatz Pfeil, 3rd and final instalment	53,352
„ Dresden (Ersatz Comet) „	53,352
Battleship Ersatz Württemberg, 2nd instalment	420,950
„ Ersatz Baden, „	420,950
Large cruiser (F.), „	440,528
Small cruiser Ersatz Greif, „	146,843
„ Ersatz Jagd, „	146,843
Fitting harbour-ship König Wilhelm as training ship for boys, final instalment	9,789
Alteration and improvement of large cruiser Hansa, final instalment	46,500
Tender Ersatz Ulan, final instalment	29,368
Battleship Ersatz Oldenburg, 1st instalment	269,210
„ Ersatz Siegfried „	269,210
„ Ersatz Beowulf „	269,210
Large cruiser (G) „	244,738
Small cruiser Ersatz Schwalbe „	122,370
„ Ersatz Sperber „	122,370
River-gunboat (C) „	24,474
Alteration and improvement of battleships Kaiser class, first instalment	97,896
Alteration and improvement of large cruiser Friedrich Carl, first instalment	48,948
Alteration and improvement of small cruisers	48,948
One Torpedo-boat Division, 2nd and final instalment	342,636
„ „ „ 1st instalment	489,480
Equipment of torpedo-boats with searchlights	19,580
Submarines, construction and experiments	342,636
Total	£5,596,185

Summary.

	Proposed for the financial year 1908.	Granted for the financial year 1907.
	£	£
Ordinary Permanent Estimates	6,543,596	5,911,276
New Construction	5,596,185	4,203,622
Armaments, Torpedoes, and Mines	2,774,351	2,084,680
Other items	430,127	383,818
Extraordinary Expenditure	1,259,185	1,042,107
Total	£16,603,444	13,625,503

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Italian Navy Estimates, 1908-9.

FINANCIAL YEAR 1ST JULY, 1908, TO 30TH JUNE, 1909.

(Converted at £1 = 25 lire.)

	Proposed for 1908-1909.	Revised Estimates, 1907-1908.
ORDINARY EXPENDITURE—GENERAL EXPENSES.	£	£
Admiralty	103,293	97,562
Pensions	290,320	276,080
Expenditure for the Mercantile Marine	399,558	394,914
Total £	793,171	768,556
EXPENDITURE FOR NAVAL SERVICES.	£	£
General Staff of the Navy	160,000	154,000
Corps of Constructors	68,400	58,160
Medical Service	30,424	29,600
Commissariat Service	37,316	36,320
Pay of Officers, and Wages of Men	562,120	515,200
Gratuities, &c.	134,000	148,000
Forts—*Personnel*	17,240	15,200
Telegraph Service—*Personnel*	12,120	9,520
" " *Matériel*	6,600	6,600
Police (Dockyards)	11,460	11,440
Salaries and Office Expenses	8,592	7,656
Barracks, Maintenance, Lighting, etc.	8,800	7,200
Rents and Water Royalties	2,924	2,780
Ships fitting out, &c.	294,040	285,200
Fuel and Stores for Ships in Commission	315,000	319,000
Victualling	362,720	345,560
Hospital Services	22,000	22,000
Naval Academy and Engineering School	17,500	16,180
Scientific Services—*Personnel*	4,760	972
" " *Matériel*	5,760	9,710
Wireless Telegraph Stations, Benadir and Eritrea	4,400	—
Workshops, Fortifications, and Stores—*Personnel*	63,600	63,396
Technical Department (Civil)—*Personnel*	38,236	38,520
Naval Constructors	21,840	21,920
Law Charges	1,344	1,320
Transport of Materials	7,200	6,600
Works Department—Repairs	101,880	101,880
Plant, Machinery and Tools; Reconstruction and maintenance of Workshops	72,000	72,000
Electric Power, Fuel and Stores for Shore Establishments	64,000	64,000
Materials for construction of new Ships and maintenance of existing Ships—Hulls, Machinery, and Armaments	934,165	877,223
Wages and Expenses of Dockyard employés	724,000	684,640
Guns, Torpedoes and Small Arms	104,800	104,800
Supernumerary Labour in Dockyards	12,000	12,000
Coast Defence—*Matériel*	12,000	12,000
Total (to next page) £	4,243,241	4,060,597

The Estimates for 1908-9 provide for the completion of battleship Roma; continuation of battleships Napoli and A, and of cruisers S. Marco and S. Giorgio; payment of instalments for purchase of cruisers Pisa and Amalfi; commencement of a subsidiary vessel for the South American station; continuation and completion of 2 lake gun-boats and of various auxiliary vessels.

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EXTRAORDINARY EXPENDITURE.

	Proposed for 1908–1909.	Revised Estimates, 1907–1908.
	£	£
Temporary Civil Staff	10,800	12,400
General Expenses and Half Pay	1,800	600
Construction and purchase of Ships and Materials for the Navy (Law of July 2, 1905)	440,000	480,000
Reorganization of Storehouses and Bakeries	31,400	20,000
„ „ Ammunition Depôts	35,320	18,000
Works required at Naval Depôts	..	16,680
Total £	519,320	547,680

SUMMARY.

	£	£
Ordinary Expenditure—General Expenses	793,171	768,556
Expenditure for Naval Services	4,243,241	4,060,597
Extraordinary Expenditure	519,320	547,680
Depreciation of Ships in Commission	140,000	140,000
Rent of Lands occupied by Government	108,149	108,087
Grand Total £	5,803,881	5,624,920

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Russian Navy Estimates, 1908.

Heads of Expenditure.	Estimates, 1908.	Assigned in 1907.
Effective Services—	£	£
Wages, &c., of Officers and Men	1,082,562	1,007,007
Victualling and Clothing	1,010,251	873,937
Medical Establishments and Services	104,752	99,305
Martial Law	19,686	19,608
Educational Services	104,058	97,936
Scientific Services	106,325	82,650
Repairs, Maintenance, and Shipbuilding	4,658,757	4,630,750
Naval Armaments	638,119	289,952
Works, Buildings, Repairs	1,117,371	772,718
Miscellaneous Effective Services	460,398	395,126
Admiralty Office	83,746	81,455
Total Effective Services	9,386,025	8,350,444
Non-effective Services—		
Pensions, Gratuities, &c., and Post-bellum Expenditure	468,167	499,796
	9,854,192	8,850,240
Less Appropriations in Aid	112,225	64,320
Total Net Estimates £	9,741,967	8,785,920

Total number of Officers and Men on January 1st, 1908, **44,949**.

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United States Navy Estimates, 1908-9.

(Converted at £1 = $4·8665, being par, as adopted by Congress.)

Objects of Expenditure and Appropriation.	Appropriated for year ending June 30, 1908.	Estimates for year ending June 30, 1909.
	£	£
Pay of the Navy	4,315,216	5,360,362
Pay, Miscellaneous	138,703	148,566
Contingent, Navy	13,357	13,357
Naval Station (for Lepers), Island of Guam	3,288	3,082
Bureau of Navigation	410,287	531,443
„ Ordnance	2,407,357	4,400,412
„ Equipment	1,546,909	2,103,561
„ Yards and Docks	232,128	355,787
Public Works under Bureau of Yards and Docks	642,133	2,477,102
Public Works under Secretary of Navy (Naval Academy)	78,085	50,755
Public Works under Bureau of Navigation (Training Stations and War College)	163,959	260,142
Public Works under Bureau of Ordnance	76,087	117,427
Public Works under Bureau of Equipment	2,055	2,055
Public Works under Bureau of Medicine and Surgery	58,563	92,469
Bureau of Medicine and Surgery	83,406	87,331
„ Supplies and Accounts	1,501,252	1,507,720
„ Construction and Repair	1,665,020	1,747,215
„ Steam Engineering	1,177,318	1,463,113
Naval Academy	90,564	99,370
Marine Corps	1,081,082	1,331,892
Increase of Navy:—		
Construction and Machinery	2,612,537	2,020,540
Armour and Armament	2,054,865	1,438,405
Equipment	154,115	82,195
Submarines	102,744	—
Navy Department; Salaries, Rent, &c.	163,230	184,628
Total	£20,774,260	£25,878,929*

* As reported to the House of Representatives on April 8th, the amount of the Naval Appropriation Bill is approximately £4,500,000 less than the original Estimates. It provides for two battleships instead of four (see page 38), while the number of submarines is raised from four to eight.

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THE HAGUE CONFERENCE.

SIR EDWARD GREY'S INSTRUCTIONS TO SIR EDWARD FRY.

Foreign Office, June 12, 1907.

SIR,

1. In my despatch of the 19th April last I informed you that the King had been graciously pleased to appoint you to be His Majesty's First Plenipotentiary to represent this country at the Second Peace Conference, which will assemble at The Hague on the 15th instant, in conjunction with the Right Honourable Sir Ernest Mason Satow, G.C.M.G., the Right Honourable Lord Reay, G.C.S.I., G.C.I.E., and Sir Henry Howard, K.C.M.G., C.B., His Majesty's Minister at The Hague. Lieut.-General Sir Edmond Roche Elles, G.C.I.E., K.C.B., and Captain Charles Langdale Ottley, M.V.O., R.N., Director of Naval Intelligence, have been appointed as Expert Delegates to assist you and your colleagues in the discussion of the military and naval questions which will come before the Conference.

2. You are aware from the correspondence that has been furnished to you from time to time that the proposal for this Conference, like that which was held at The Hague in 1899, emanated from His Majesty the Emperor of Russia, who in the spring of last year addressed an invitation to His Majesty's Government to be represented at it. A similar invitation was at the same time sent to some forty-seven other States. The note conveying this invitation also indicated certain topics which it was thought might usefully be discussed at the Conference, and which may be summarised as follows :—

(I.) Improvements to be made in the provisions of the Convention respecting the pacific settlement of international disputes regarding both the Court of Arbitration and the International Commissions of Inquiry.

(II.) Additions to be made to the provisions of the Convention of 1899 respecting the Laws and Practices of Land Warfare, among others the opening of hostilities, the rights of neutrals on land, &c., consideration of the Declarations of 1899 and the question of the renewal of the one that has lapsed.

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(III.) Elaboration of a Convention respecting the Laws and Practices of Naval Warfare concerning—

(A.) The special operations of naval warfare, such as the bombardment of ports, towns, and villages by a naval force, the laying of mines, etc.

(B.) The transformation of commercial vessels into war-ships.

(C.) The private property of belligerents at sea.

(D.) The period to be accorded to commercial vessels in leaving neutral ports or those of the enemy after the outbreak of hostilities.

(E.) The rights and duties of neutrals at sea, among other questions that of contraband, the treatment to which the ships of belligerents should be subjected in neutral ports, destruction by *force majeure* of neutral ships of commerce, as prizes.

(F.) Arrangements relative to land warfare which should be made equally applicable to naval warfare.

(IV.) Additions to be made to the Convention of 1899 for the adaptation to naval warfare of the principles of the Geneva Convention of 1864.

3. In accepting this invitation, His Majesty's Government expressed the opinion that the subjects above indicated might, as a whole, be freely discussed with advantage, but they thought it desirable to reserve generally the right to abstain from taking part in the discussion at the Conference of any of the questions mentioned in the programme, should the discussion take a form unlikely, in their opinion, to lead to any useful result. Several other Powers have, as you are aware, made a similar reservation.

4. His Majesty's Government further reserved to themselves the right of suggesting the discussion of other cognate questions of international interest not specifically mentioned in the programme. Foremost among such questions is that of expenditure on armaments, which His Majesty's Government have from the first been desirous of seeing discussed at the Conference. They felt it was better to have a discussion, even if it did not lead to a satisfactory conclusion. Discussion without result would, at any rate, have kept the door open for continuing negotiations on the subject. Whereas, to put the question aside would seem like an admission that it was hopeless, and had receded since the first Conference, of which it was the prime object. They felt that, this being a question on which perhaps there must be many discussions, and even failures, before progress is made,

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even a failure to secure a definite result was better than no discussion at all.

5. His Majesty's Government have accordingly reserved their right to bring this question forward at the Conference, and have told the United States Government, who have made a similar reservation, that they would support them in promoting a discussion. If, therefore, the United States' Delegates bring the subject forward, it will be your duty to support them. But, after the apparently final declaration of the German Government, that under no circumstances would they take any part in such a discussion, it is doubtful how far it would be expedient to proceed with it. The position of Germany, both as a military and a naval Power, is such that it is difficult to regard as serious any discussion in which she does not take part. His Majesty's Government would be most reluctant that anything should take place at The Hague Conference, summoned, as it is, in the interests of peace, that would be of a nature to cause friction or ill-feeling. You will therefore consult closely with your United States' colleagues, and ascertain what instructions they have, and consider with them what line it is best to take.

6. The Spanish Government have also made a similar reservation on this question, and their Delegates should also be consulted; and it is possible that the Italian Delegates may also have some instructions as to the procedure to be adopted.

7. Should it be decided that the subject shall be discussed and a practical proposal be invited, you are authorised to say that His Majesty's Government would agree to a proposal that the Great Powers should communicate to each other in advance their programmes of new naval construction. If this were done, they might be led to realise how closely in some cases the naval construction of one Power is dependent upon that of another; and an opportunity would be given for negotiations with the object of reducing the programmes, before the Governments of the Great Powers were finally committed to them by announcing them to their respective Parliaments. His Majesty's Government are aware that this would not necessarily lead directly to any reduction in expenditure, but they are hopeful that the mere fact of communication between the Powers would provide opportunities for negotiation that do not now exist, and would tend to alleviate the burden of expenditure or retard its increase. Though, however, they consider that this or some other proposal put forward by another Power would be useful for the sake of the discussion to which it would give rise, even if it were not eventually accepted, you should not put forward any proposal unless there be a general decision and a strong desire that a discussion

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should take place, and unless it is made clear that such a course will be taken in good part.

8. I now pass to the consideration of the various heads of the programme in the order in which they are set out in the invitation:—

I. *Improvements to be made in the Provisions of the Convention of* 1899 *respecting the Pacific Settlement of International Disputes.*

9. I am not aware of any proposals that will be made by other Powers for amending the provisions of this Convention, but I believe that Professor de Martens will, with the concurrence of the Government of the Czar, suggest certain amendments for increasing the utility of the "Commission d'Enquête" provided for in Articles IX.–XIV. of the Convention. The nature of the proposal is not at present known, but as at present advised I see no reason for thinking it likely that His Majesty's Government will be unable to agree to them, if you and your colleagues report that you consider that they may be introduced into the Convention with advantage.

10. His Majesty's Government, however, are anxious to secure the adaptation of the machinery of the existing Tribunal, which was created by the Convention, to the purposes of an International Tribunal of Appeal from the decisions of belligerent Prize Courts affecting neutrals. The judgments of the Tribunal in such cases would probably prove the most rapid and efficient means which can, under existing conditions, be devised for giving form and authority to the canons of international law in matters of prize. It would no doubt be necessary that the procedure of the Court should be formulated, and its powers precisely defined, and that the Powers should bind themselves to employ the executive of their Governments to enforce its decrees against their own subjects or citizens. The advantages would far outweigh any difficulty that might arise from the fact that some alterations in the municipal laws of this country, and probably also of other States, would be required. His Majesty's Government consider that if The Hague Conference accomplishes no other object than the constitution of such a Tribunal, it will render an inestimable service to civilisation and mankind.

11. It is not improbable that the question of the choice of languages to be used by and before the Permanent Court of Arbitration may be raised under the present head. By Articles XXX. and XXXVIII. of the Convention it is for the Tribunal itself to decide this point, unless the parties have themselves settled the language question in advance. His Majesty's Government are aware that in some cases which have come before the Court this rule has

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been found to involve practical difficulties, but, after careful consideration, they have come to the conclusion that the existing arrangement is the best that can hope to meet with general consent. You should accordingly not support any suggestion which may be made at the Conference for altering the rules as to the choice of languages.

II. *Additions to be made to the Provisions of the Convention of* 1899 *respecting the Laws and Practices of Land Warfare, etc.*

12. The Russian Government have mentioned the opening of hostilities and the rights of neutrals on land as matters which might be treated in additional stipulations. But beyond this indication, no intimation has reached His Majesty's Government as to the precise measures or principles which are to be brought forward for adoption. As at present advised they are not aware that the necessity or advisability of any such additions to the Convention has made itself felt in this country, and they have had no material before them enabling them to foreshadow the direction which a discussion on the points briefly mentioned in the Russian programme might take at the Conference. They therefore feel unable to lay down any specific directions for your guidance in the matter, and can only at this stage express their readiness to give any definite proposals which may eventually be made the earnest and impartial consideration which the important nature of the subject deserves.

13. The declarations referred to in the Russian note were the agreements to abstain from (1) the use of projectiles diffusing noxious gases; (2) the use of expanding bullets; and (3) the use of projectiles and explosives from balloons for a term of five years, that were signed by a majority of the Powers at the last Hague Conference, Great Britain, Germany, the United States, etc., dissenting. Should these questions be raised at the Conference, His Majesty's Government think, as regards (1), that it is unnecessary for you to take the initiative in proposing such a prohibition, although you should not dissent from it if there should be a general consensus of the other Powers in its favour; with respect to (2), that the restriction may be supported so far as warfare between the High Contracting Powers is concerned; and with regard to (3), you should support any proposal for the renewal of this prohibition.

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III. *Elaboration of a Convention respecting the Laws and Practices of Naval Warfare concerning—*

(A.) *The Special Operations of Naval Warfare, such as the Bombardment of Ports, Towns, and Villages by a Naval Force, the laying of Mines, etc.*

14. His Majesty's Government consider that the objection, on humanitarian grounds, to the bombardment of unfortified towns is too strong to justify a resort to that measure, even though it may be permissible under the abstract doctrines of international law. They wish it, however, to be clearly understood that any general prohibition of such practice must not be held to apply to such operations as the bombardment of towns or places used as bases or storehouses of naval or military equipment and supply, or ports containing fighting ships, and that the landing of troops, or anything partaking of the character of a naval or military operation, is also not covered.

15. His Majesty's Government would view with satisfaction the abandonment of the employment of automatic mines in naval warfare altogether. Failing the acceptance of such a total prohibition, they earnestly hope that the employment of these engines of war will only be sanctioned under the strictest limitations. They would advocate an arrangement by which the use of automatic mines should be limited to territorial waters, and, if possible, to such portions of territorial waters as adjoin naval bases or fortified ports. All mines thus employed should be effectively anchored, and so constructed that, in the event of their breaking adrift, they would either automatically become harmless or sink, and that in any case their active life should not exceed a limited period of, say, six months.

(B.) *The Transformation of Commercial Vessels into War-ships.*

16. As the best and surest means to meet the many difficulties arising in connection with the question of the status, or belligerent character, of ships engaged in naval operations, His Majesty's Government would like to see the Powers agree upon some precise definition of a "war-ship." Having given their attentive consideration to the problem in its many various aspects, they are of opinion that if such definition is to cover all vessels which may be directly associated with the warlike operations of a fleet, it should establish and comprise two categories of ships, viz.: (A) fighting ships, and (B) fleet auxiliaries. For these two classes of vessels, you might propose for acceptance some such definition as the following:—

(A) "Any vessel under a recognised naval flag, officered and manned by regular commission, and armed for the

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purpose of attacking an enemy, no vessel being allowed to assume this status unless before leaving a national port, or to surrender it except after arrival at one."

(B) "A vessel under the mercantile flag of either a belligerent or neutral State which is engaged in transporting troops or on duties bringing her into direct communication with the belligerent fighting ships for the purpose of assisting their operations, either by the conveyance of seamen, munitions of war, fuel, provisions, water, or any kind of naval stores, or by executing repairs, or by carrying despatches or information, and whether such ship sails in company with the fighting ships or only meets them from time to time."

17. The general acceptance of definition (A), as supplemented by definition (B), coupled with a general undertaking that no vessel was to perform fighting services unless qualified under definition (A), would, it is believed, prove sufficient to prevent the issue by any Power of letters of marque (whether such Power were a party to the Declaration of Paris or not), as none but regularly commissioned men-of-war would have the status of "fighting ships." You might with advantage ascertain the views of your United States' colleagues on this subject, to which particular importance is likely to be attached by their Government, special regard being had to the fact that, although conditionally refusing to sign the Declaration of Paris, the United States intimated their intention of observing it during the war with Spain in 1898.

(C.) *The Private Property of Belligerents at Sea.*

18. It is probable that a proposal will be brought before The Hague Conference to sanction the principle of the immunity of enemies' merchant ships and private property from capture at sea in time of war. His Majesty's Government have given careful consideration to this question, and the arguments on both sides have been fully set out in the various papers which have been at your disposal. They cannot disregard the weighty arguments which have been put forward in favour of immunity. Anything which restrains acts of war is in itself a step towards the abolition of all war, and by diminishing the apprehension of the evils which war would cause, removes one incentive to expenditure upon armaments. It is also possible to imagine cases in which the interests of Great Britain might benefit by the adoption of this principle of immunity from capture.

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19. But, on the other hand, it must be remembered that the principle, if carried to its logical conclusion, must entail the abolition of the right of commercial blockade. Unless commercial blockade is discontinued there will be constant interference with an enemy's ships, and constant disputes as to what constitutes an effective blockade. And when such disputes have once arisen between belligerent Powers it is obvious that the one which considers itself aggrieved by the application of commercial blockade to any of its ports would cease to respect the immunity of the merchant ships and private property of its enemy, wherever they were to be found. It seems to them, therefore, that it is impossible to separate this question of immunity from capture from that of commercial blockade; and that the question to which His Majesty's Government have to apply themselves is whether they should agree to a proposal which would deprive the British Navy in time of war of the right of interfering with an enemy's merchant ships or property, and of the power of commercial blockade.

20. The British Navy is the only offensive weapon which Great Britain has against Continental Powers. The latter have a double means of offence: they have their navies and they have their powerful armies. During recent years, the proportion between the British Army and the great Continental armies has come to be such that the British Army operating alone could not be regarded as a means of offence against the mainland of a great Continental Power. For her ability to bring pressure to bear upon her enemies in war Great Britain has, therefore, to rely on the Navy alone. His Majesty's Government cannot, therefore, authorise you to agree to any Resolution which would diminish the effective means which the Navy has of bringing pressure to bear upon an enemy.

21. You should, however, raise no objection to the discussion of this question of immunity from capture at the Conference, nor should you refuse to participate in it, nor need you necessarily take the initiative in opposing a Resolution if brought forward. If at some future date the great Continental armies were to be diminished, and other changes favourable to the diminution of armaments were to take place, the British Government might be able to reconsider the question. If, for instance, nations generally were willing to diminish their armaments, naval and military, to an extent which would materially relieve them from the apprehension of the consequences of war, and by rendering aggression difficult would make war itself improbable; and if it became apparent that such a change could be brought about by an agreement to secure this immunity from capture at sea under all circumstances and was dependent upon it, the

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British Government might feel that the risks they would run by adhering to such an agreement and the objections in principle now to be urged against it, would be outweighed by the general gain and relief which such a change would bring. But at the present time they are unable to assent to a Resolution which might, under existing conditions, so limit the prospective liability of war as to remove some of the considerations which now restrain public opinion from contemplating it, and might, after the outbreak of war, tend to prolong it.

(D.) *The Period to be accorded to Commercial Vessels in leaving Neutral Ports or those of the Enemy after the Outbreak of Hostilities.*

22. It has been customary on the outbreak of hostilities for belligerents to grant certain days of grace to enemy and neutral ships. In the view of His Majesty's Government the allowance of such an interval before the strict rules of hostilities are enforced should, as indeed the term "days of grace" implies, be treated purely as a matter of grace and favour, and not as one of right, and they are of opinion that any fixed rule on the point would be undesirable, as the circumstances of each case must necessarily differ. It will be to the general interest of this country to maintain the utmost liberty of action in this particular.

(E.) *The Rights and Duties of Neutrals at Sea: among other Questions that of Contraband; the Treatment to which the Ships of Belligerents should be subjected in Neutral Ports; Destruction by* force majeure *of Neutral Ships of Commerce as Prizes.*

23. Many questions in regard to neutrality obligations may be raised at the coming Conference as a result of the experience of the late war between Russia and Japan. On the general principles involved nations are agreed, but in the application of these principles great divergence in the standard of obligations adopted by different Powers is sure to arise. Rules based on the following principles would, His Majesty's Government consider, help to clear the situation:—

(*a.*) Neutrals shall not allow their territorial waters to be used for purposes which will directly assist a belligerent in operations of war.

(*b.*) Neutrals shall not allow fighting ships, or ships built or equipped, wholly or partly, for fighting purposes to leave their ports or territorial waters after the outbreak of war with the intention of assisting either of the belligerents.

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(*c.*) The customary maritime facilities known as "hospitality" shall not be withheld.

(*d.*) A neutral State is not called upon to enforce the observance of the restrictions imposed upon trade by a belligerent by declarations of contraband, but must not assist in their violation.

(*e.*) A neutral shall not allow the entrance of prizes into its harbours unless the prize is in want of fuel or supplies, or in actual danger on account of bad weather or unseaworthiness.

24. Great Britain as a belligerent is not likely, in any conditions which can at present be foreseen as probable, to have to depend on the assistance of neutrals in the direct carrying out of operations of war. Her interests as a neutral require uniformity of practice on the part of neutrals generally, and it would be desirable that the rules which obtain in this country as regards the obligations of neutrality should, if possible, obtain international sanction at the Conference.

25. With regard to contraband, many most difficult questions arose during the late war. These cases were sufficient to show that the rules with regard to contraband that were developed at the end of the eighteenth and the beginning of the nineteenth centuries are no longer satisfactory for the changed conditions under which both commerce and war are now carried on. His Majesty's Government recognise to the full the desirability of freeing neutral commerce to the utmost extent possible from interference by belligerent Powers, and they are ready and willing for their part, in lieu of endeavouring to frame new and more satisfactory rules for the prevention of contraband trade in the future, to abandon the principle of contraband of war altogether, thus allowing the oversea trade in neutral vessels between belligerents on the one hand and neutrals on the other, to continue during war without any restriction, subject only to its exclusion by blockade from an enemy's port. They are convinced that not only the interest of Great Britain, but the common interest of all nations will be found, on an unbiassed examination of the subject, to be served by the adoption of the course suggested.

26. In the event of the proposal not being favourably received, an endeavour should be made to frame a list of the articles that are to be regarded as contraband. Your efforts should then be directed to restricting that definition within the narrowest possible limits and upon lines which have the point of practical extinction as their ultimate aim.

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27. If a definite list of contraband cannot be secured, you should support and, if necessary, propose regulations intended to insure that nations shall publish during peace the lists of articles they will regard as contraband during war, and that no change shall be made in the list on the outbreak of or during hostilities.

28. A list might be prepared and submitted for adoption by the Conference, specifying the articles which in no event shall fall within the enumeration of contraband, *e.g.*, mails, food-stuffs destined for places other than beleaguered fortresses, and any raw materials required for the purposes of peaceful industry. It is essential to the interest of Great Britain that every effective measure necessary to protect the importation of food supplies and raw materials for peaceful industries should be accompanied by all the sanctions which the law of nations can supply.

29. His Majesty's Government would further be glad to see the right of search limited in every practicable way, *e.g.*, by the adoption of a system of Consular certificates declaring the absence of contraband from the cargo, and by the exemption of passenger and mail steamers upon defined routes, etc.

30. If an arrangement can be made for the abolition of contraband His Majesty's Government would be willing, for their part, that it should also extend to what are technically known as the "analogues of contraband," viz., the carriage of belligerent despatches and of persons in the naval and military services of a belligerent in cases where the rendering of such services by the neutral was not of such a kind or so great in extent as to identify the neutral vessel with the belligerent forces, and bring her within the definition of war-ship which His Majesty's Government are anxious to secure.

31. The object which His Majesty's Government have in view, as you are aware, is to limit, so far as may be, the restrictions that war entails upon legitimate neutral trade, and they feel that the extent to which this is possible in connection with the "analogues of contraband" is a matter that must be worked out in detail at the Conference.

32. Upon one point, however, they do desire to lay particular stress. The question of the carriage of enemy despatches cannot be entirely separated from that of mails in general, and they would welcome, and wish you to do all you can to secure, an arrangement under which mail packets or bags in transit on board a neutral ship, in accordance with the provisions of the Postal Conventions, should be inviolable, even though such mails should contain despatches for a belligerent, and the neutral vessel carrying such mails should not be subjected to any interference for so doing except in the case of her endeavouring to violate a blockade.

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33. The subject of the treatment of interned belligerent vessels appears to be included in the Russian programme under the heading, "Régime auquel seraient soumis les bâtiments des belligérants dans les ports neutres." His Majesty's Government hold that while the war-ship of a belligerent taking refuge in a neutral port must, failing her departure within twenty-four hours, be interned, the question of her ultimate disposal is one which it would be best to leave to be dealt with under the terms of the Treaty of Peace. You will no doubt remember that one of the conditions of peace put forward by the Japanese Plenipotentiaries at the negotiations at Portsmouth, U.S.A., but afterwards abandoned, was the surrender to Japan of the Russian war-ships which had taken refuge at Kiao-chau, Shanghae, and Saigon, and which had there been interned.

34. As regards the sinking of neutral prizes, which gave rise to so much feeling in this country during the Russo-Japanese war, Great Britain has always maintained that the right to destroy is confined to enemy vessels only, and this view is favoured by other Powers. Concerning the right to destroy captured neutral vessels, the view hitherto taken by the greater Naval Powers has been that, in the event of it being impossible to bring in a vessel for adjudication, she must be released. You should urge the maintenance of the doctrine upon this subject which British prize courts have, for at least two hundred years, held to be the law.

IV. *Additions to be made to the Convention of* 1899 *for the Adaptation to Naval Warfare of the Principles of the Geneva Convention of* 1864.

35. A Convention of fourteen articles, applying the principles of the Geneva Convention of 1864 to maritime warfare, was signed by the Powers represented at The Hague Conference of 1899, Article X. (respecting the landing of the shipwrecked, wounded, or sick of a belligerent Power at a neutral port) being excluded at the time of ratification both by this country and the other Signatory Powers. The Russian programme contemplates supplementary provisions to the Convention, which are to deal only with the treatment of shipwrecked, wounded, or sick men, and with vessels employed for these purposes, and His Majesty's Government see no reason why they should withhold their consent to such provisions, if proposed at the Conference, provided that misuse of the privileges involved can be prevented.

36. In addition to the subjects mentioned in the Russian programme, His Majesty's Government believe that a discussion will be initiated by the Government of the United States on the question of

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the employment of armed force for the collection of ordinary contract debts due to the subjects or citizens of a Power by other Governments. This practice is viewed with great disfavour on the American Continent, and the objections to it have become embodied in a principle known as the "Drago Doctrine." His Majesty's Government consider that you may express a general adherence to the "Drago Doctrine," subject to the limitations mentioned in section 4 of the "Instructions to the United States' Delegates to the Third International Conference of American States," a copy of which was communicated to my predecessor by the American Ambassador on the 7th November, 1906. That is to say that, as a general principle, the debts of a State to the private subjects of another State are not to be collected by the employment of coercive measures in the nature of war, although occasions may, and do, occur when the non-payment of public debts is accompanied by such circumstances of fraud and injustice or violation of Treaty obligations as to justify the resort to force as a means of compelling payment. Each case, as it arises, must be considered on its merits, and the Government of the injured individual must decide in each case whether the general rule has or has not been overstepped to a degree sufficient to justify or demand interference.

37. Another matter which may be raised at the Conference is the extension of the three-mile limit as the normal boundary of territorial waters. His Majesty's Government are opposed to the extension of the three-mile limit. It is now accepted by practically every country, and to enlarge such limit on account of the longer range of modern artillery or other cause would introduce uncertainty into what is now defined and settled, and would only increase the area over which the preservation of neutrality is obligatory upon a neutral Power, thus tending to diminish the sphere of action of the strongest navy, and to add to the difficulties of the weaker Powers.

38. The foregoing observations and directions will place you in possession generally of the views of His Majesty's Government on the various points set out in the Russian programme. More precise instructions will, if necessary, be furnished to you from time to time as occasion may require.

39. I enclose a Full Power under the Royal sign manual, which will enable you and your co-Plenipotentiaries to sign with or without reservations, and subject to ultimate ratification by the King, any Convention which may result as the outcome of your labours, and I request you to keep me fully and constantly informed of the proceedings of the Conference, which His Majesty's Government will watch with the greatest interest.

I am, &c.,

(Signed) E. GREY.

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Sir E. Fry's Report to Sir Edward Grey.

(Received October 17.)

Hôtel des Indes, The Hague, October 16, 1907.

Sir,

Now that the Second Peace Conference is at last approaching its end, we venture to lay before you some observations on the results of the meeting.

These results are less than might have been hoped for, but are perhaps as great as could reasonably be expected when all the circumstances are considered. The great volume of most important subjects laid before the Conference under the terms of reference, the large number of the nations represented, the necessary divergence of views and of interests on many questions, the complicated character of the procedure of the Commissions and Sub-Commissions of the Conference,—all these and other things have stood in the way of the accomplishment of many of the objects which might have been desired.

In your original instructions to us of the 12th June you stated that His Majesty's Government were anxious to secure the adaptation of the machinery of the existing Tribunal at The Hague for the purposes of an International Tribunal of Appeal from the decisions of belligerent Prize Courts affecting neutrals, and you added that His Majesty's Government considered that if The Hague Conference accomplished no other object than the constitution of such a Tribunal it would render an inestimable service to civilisation and mankind. It is therefore a subject of satisfaction, and we hope of legitimate satisfaction, to us that we have been able to accomplish the task thus laid upon us, not, indeed, in the form of an adaptation of the machinery of the existing Court, but in the form of a new institution; and we may perhaps be permitted to add that this Convention appears to us to be a very noteworthy step in the history of law as the first attempt to constitute a really International Court, and as the first device to produce uniformity in any branch of international law. The Report of M. Renault on the subject of this new Court is a document of great interest.

In addition to the constitution of a Prize Tribunal, the Conference has subjected the systems of international inquiry and of the Permanent Court of Arbitration under the Convention of 1899 to a complete revision, and has, amongst other amendments, introduced a summary procedure adapted to the speedy settlement of small cases. The principal object in view in many of the amendments has

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been to provide beforehand an optional system of procedure in inquiries and arbitrations, thus obviating the necessity of framing rules of procedure in each case, either by the Protocols or by the Commission or the Arbitral Court.

Two other projects of great interest in connection with international arbitration were laid before the First Commission of the Conference, one for the establishment of a new Court of Arbitral Justice, and the other for compulsory arbitration in certain cases. Both these projects were debated at great length and in great detail, but both failed of reaching embodiment in the form of complete Conventions. We cannot but hope that the difficulties which we have been unable to overcome may hereafter be surmounted, and that our labour as pioneers may in the end not prove entirely fruitless.

On the question of contraband and the seizure of private property at sea, the propositions of Great Britain and of the United States of America respectively have each received a majority of votes, but in neither case will the resolutions be embodied in a Convention under the agency of the Conference. The willingness of a large number of Powers to join in the entire abolition of contraband, and of America to abolish conditional contraband, will, we hope, be fruitful of diplomatic results in the near future.

The discussions on the subject of automatic mines have been, as you are aware, protracted, and have resulted in only a very partial adoption of the British proposals. We hope that one result of the debates may be to awaken public attention to the gravity of the danger which is threatened by the use of mines.

The Conventions with regard to floating mines, balloons, bullets, and gases, afford illustrations of the duty laid on diplomacy by the moral sense of mankind by checking the application in practice of the discoveries of science, and thus of asserting the supremacy of the moral over the intellectual part of human nature.

The labours of the Conference on the subjects of the declaration of war, the application of the Geneva Convention to naval warfare, bombardment of undefended places, the treatment of crews of captured enemy merchant-ships, the immunity of fishing-boats and mail-bags, the rights and duties of neutrals, the transformation of ships of commerce into ships of war, the days of grace, blockade, and the destruction of neutral prizes, will, we trust, not prove without good results.

A very important step taken by the Conference is embodied in the Resolution of the 21st September, which makes certain provisions with a view to a third meeting of a Peace Conference.

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The actual results of the Conference will be embodied in thirteen Conventions, one Declaration, one draft Convention, and eight Resolutions.

The Final Act which briefly summarises the work of the Conference will be the only document that we shall sign at the conclusion of the Conference. The Conventions and the Declaration are technically annexes to it, and will remain open for signature till the 30th June, 1908, with the exception of the International Prize Court Convention, which (under Article LIII.) can be signed up till the 30th June, 1909. All Powers signing before the specified dates will be regarded as original signatories of the Conventions. The shorter of these periods is slightly longer than that which was provided in the Final Act of the First Peace Conference, and will, we hope, be found to give sufficient time for the careful consideration of each of the draft Conventions by His Majesty's Government.

With the exception of reserves on one or two minor points, which will be found recorded in the *procès-verbaux* of the plenary meetings of the Conference, we have expressed no objection to any of the Conventions or to the Declaration about balloons, with the exception of the Convention relating to the Rights and Duties of Neutral States during Maritime War. Some of the Articles in this Convention have rendered it, in our opinion, desirable that we should make the most distinct reserves with regard to it, and when it was brought before the Conference we therefore abstained from voting. A similar attitude was adopted by certain other important maritime States.

There yet remain a few observations to be made of a more general character.

In the first place, it must be admitted that one result of the Conference has been to bring into very definite contrast the views entertained by Great Britain and by certain other Powers on many questions of international law; and we earnestly hope that, by means of a naval Conference or otherwise, some of these differences may be arranged before the new International Court of Prizes is called upon to act.

In the next place, the machinery of this Conference has proved in a high degree dilatory and confusing, the rights of individual Delegates to take up the time of the Conference, the rights of the majority over a minority in the absence of unanimity, the power of a Chairman to confine the discussions within due limits—these and many other questions demand solution before another meeting of the Conference can prove satisfactory.

The claim of many of the smaller States to equality as regards not only their independence, but their share in all international

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institutions, waived by most of them in the case of the Prize Court, but successfully asserted in the case of the proposed new Arbitral Court, is one which may produce great difficulties, and may perhaps drive the greater Powers to act in many cases by themselves.

Though necessarily often from time to time standing in opposition to some of our colleagues of other nations, our personal relations with them have throughout been friendly, and in many cases cordial.

In conclusion, we have great satisfaction in placing on record our high appreciation of the diligence, care, and ability with which the duties of Secretary and of Legal Councillor to the delegation have been discharged by Mr. Eyre Crowe and Mr. C. J. B. Hurst respectively. The amount of work which has devolved upon these gentlemen has been far greater than could have been anticipated, and we are deeply indebted to them for the invaluable assistance which they have throughout rendered to us with unflagging zeal.

We desire also to bring to your notice the services of the Honourable Charles Tufton and of Mr. Joseph Addison, to whom were intrusted the care of the archives of the delegation and the preparation of documents in the French language. The unremitting and punctual performance by these gentlemen of the duties which fell to their share is worthy of all praise.

I have, &c.,
(Signed) EDW. FRY.

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